Railway Engineering and Maintenance

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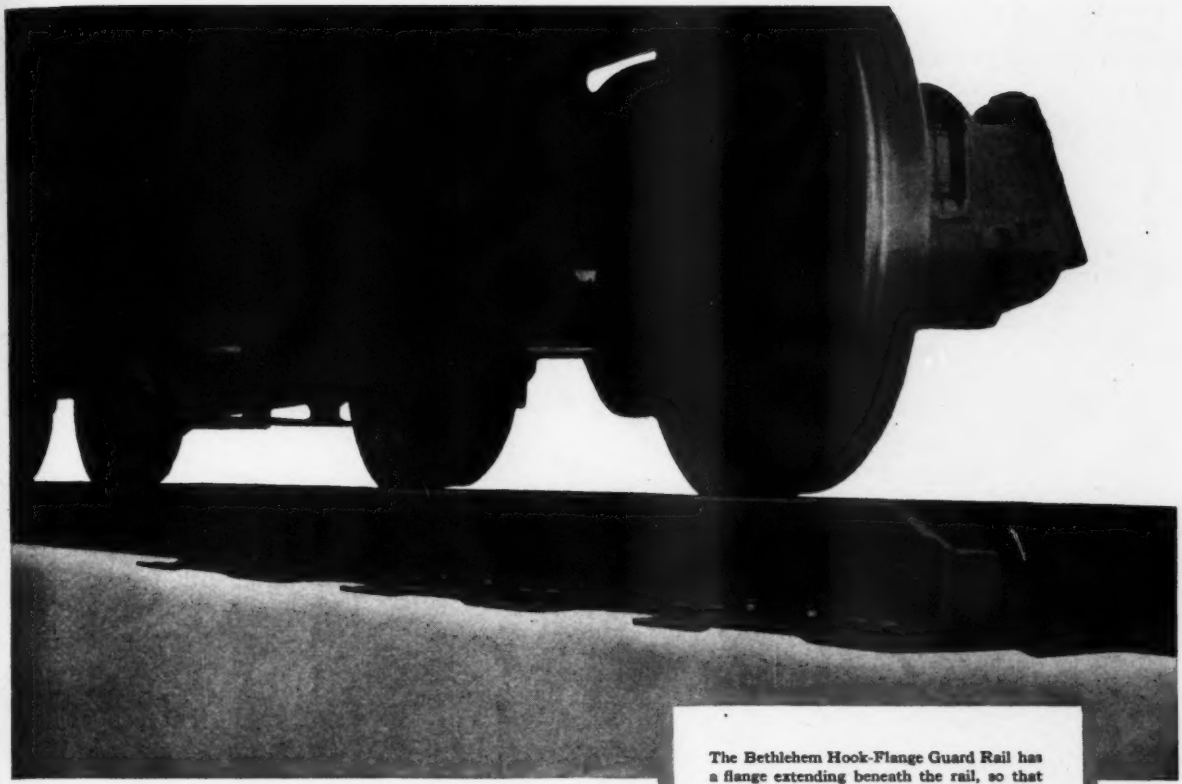

The Bethlehem Hook-Flange Guard Rail has a flange extending beneath the rail, so that the weight of the train on the rail holds the guard rail securely in place, regardless of the side thrust against it.

Weight of the train keeps guard rail from overturning

While Bethlehem Hook-Flange Guard Rails are a sound selection in any year and season, right now they are needed more than ever. Trackwork is carrying the heaviest loads in railroad history. Every switch, every rail, every guard rail must do its part to keep war traffic rolling. And the Bethlehem Hook-Flange Guard Rail can be counted on to do just that. That's because this Bethlehem guard rail is made tough and resilient. There is no record of one ever having failed in service. Furthermore, this guard rail provides extra security for war traffic because its special hook-flange design directly utilizes the weight of the train to prevent overturning.

Another feature of this guard rail is that the design permits dissipation of impacts and absorbs shocks. It eases fast-moving wheels into line without shock and jolt, holding guard rail maintenance costs down and avoiding the danger of cracking or chipping wheels.

Look into the advantages of specifying Bethlehem Hook-Flange Guard Rails—on high-speed track, in classification yards, and in terminals. It's made for all weights and types of track, in any length required.

BETHLEHEM BETHLEHEM STEEL **HOOK-FLANGE GUARD RAIL**

All along the line—

DUFF•NORTON JACKS

A SHORTCUT TO FASTER MAINTENANCE

The Railroad Man's favorite Track Jack—Duff-Norton No. 117.

The work goes faster with Duff-Norton Jacks on the job! Easy-to-operate, speedy, dependable, these mechanical muscles stretch your manpower further.

Duff-Norton Jacks are sturdily built to take the toughest kind of war-time service. Make full use of them to speed your track work.

Write for Catalog 201—a handy 56-page data book on the complete line of Duff-Norton Jacks

THE DUFF-NORTON MANUFACTURING COMPANY
PITTSBURGH, PA.
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BATTLEFRONT BOUND ON A *Wartime* MISSION

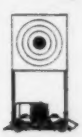
STOWED deep in the hold of an outbound cargo ship, hundreds of BUDA motor cars are "all to the front" to help our engineers maintain the vital network of railroads supplying United Nations forces on the World's battlefields.

Buda motorcars like the "Roadmaster" shown above (2-4 man car for inspection and general utility work) offer the advantages of completely reliable performance, easy handling and utmost safety to help in our crucial battle of supply — both at home and abroad.

A FEW BUDA RAILROAD PRODUCTS NOW WORKING FOR *Victory*

MOTORCARS for U. S. Military Railway Service

...V—



TARGET CARS for U. S. Target Ranges

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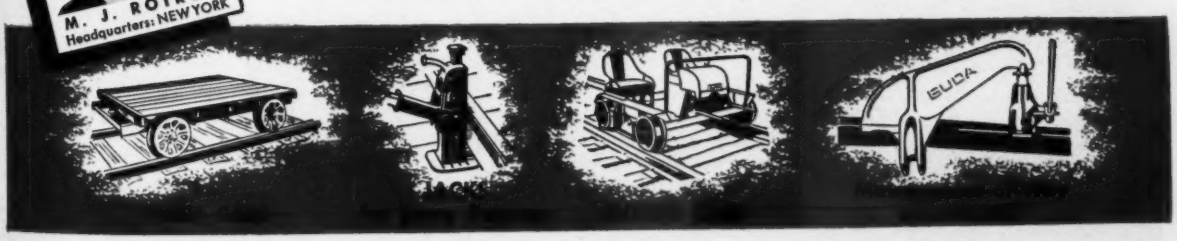
JACKS for every purpose

Also Earth Drills for the Army and Navy

THE BUDA CO. HARVEY (Chicago Suburb) ILLINOIS



Rail Cropped in Track!

MULTIPLE RAIL CROPPING WITH RACINE HIGH SPEED PORTABLE RAIL SAWS

Actual photos taken right on the job showing Racine Rail Saws at work. Note the portability of these saws in the lower photo.

RACINE *High Speed* Portable Rail Saws

Conserve STEEL—TIME *and* LABOR

Racine's rail cropping method conserves steel, reduces manpower and lessens traffic delays. Racine High Speed Portable Rail Saws help solve your rail maintenance problems caused by increased traffic. Since you can crop rails anywhere in the track—no need for relaying complete sections — no heavy "on track" equipment necessary.

BETTER RAIL JOINTS AT LOWER COST

One important road reports that rail cropping not only produced better joints, but in addition lowered maintenance costs 10% and increased rail life six years. 85-lb. rails were cut in 3 to 5 minutes—an average of 150 rails cropped in one day! Sixty-six men did this rail cropping job at a cost of only $2.20 per rail—including marking of rail, drilling for new joints, sawing, removing spikes, etc., under varying weather and traffic conditions. Alert roads are today taking advantage of Racine's rail maintenance method. Racine Portable Rail Saws are available with either gas engines, electric motors or air motors. Complete information and prices on request, address Dept. RE-S.

Investigate Racine's complete line of Hydraulic Metal Cutting Machines. Capacities 6" x 6" to 20" x 20".

HATS OFF TO THE RAILROADS!

We congratulate Our Railroads for the unbelievable feats they are daily accomplishing in their staggering War chore. Without such achievement, Victory would be impossible.

STANDARD FOR QUALITY AND PRECISION · RACINE · RACINE TOOL and MACHINE CO.

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Elastic RAIL SPIKES

WHAT THEY ARE AND WHAT THEY DO

ELASTIC Rail Spikes, made of high grade spring steel, maintain heavy spring pressure on base of rail and thus anchor the tie plate. By their use tie plate abrasion, spike killing of ties, rail creepage, maintenance costs, and steel consumption are reduced, and better gage is maintained. They are easy to apply and effective in service.

ELASTIC RAIL SPIKE CORPORATION

Affiliate of Bernuth, Lembcke Co., Inc.

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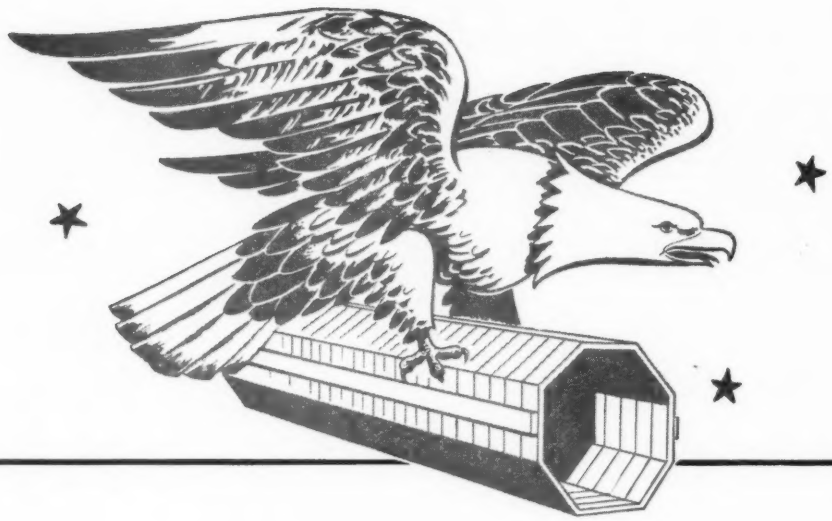


THIS STURDY WOOD PIPE

Simplifies Wartime Drainage

Why worry about materials, labor and transportation? Use ARMCO Emergency Wood Pipe and essential wartime drainage will be taken care of economically, efficiently, and *patriotically*.

The special design of this sturdy pipe requires no steel sheets and bands, wire mesh, metal reinforcing or other critical materials. It is amply strong to meet railway requirements. Handling is easy and skilled labor is not required for installation. Equally important, ARMCO Wood Pipe is light in weight and nestable, which often means up to 80 per cent savings in transportation.

Remember, ARMCO Corrugated Metal Pipe is only on temporary "leave of absence." When military needs are satisfied it will be back with its flexible strength, long lengths, tight joints and low installation costs.

Meanwhile, you can speed Victory by using steel only where engineering integrity demands it. ARMCO Emergency Wood Pipe is a practical substitute and the steel it conserves means more tanks, guns and ships for our fighting forces.

Write for complete information. Armco Railroad Sales Co. Incorporated, 1465 Curtis Street, Middletown, Ohio.

ARMCO ARMCO **EMERGENCY PIPE**

OUT OF THE WAY . . .
WHILE CLEARING THE WAY!

Railroads throughout the country are finding out about the increased efficiency and greater savings made on maintenance jobs where Link-Belt Speeders are being used. These machines do their vital work without interfering with other equipment or schedules. Link-Belt Speeder shovels, draglines and cranes are helping to maintain right-of-way, banking, ditching, doing bridge work and similar type of jobs — without interfering with routine operations. They can be shifted from one spot to another quickly and with a minimum of trouble. There are 25 different models of Link-Belt Speeder crawler and wheel mounted shovels, draglines and cranes — a machine to fill every need.

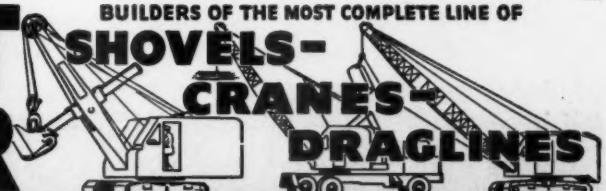
Link-Belt Speeder LS-85 dragline owned and operated by Erie Railroad Company for maintenance-of-way work.

"STAY ON THE JOB — *absence makes the war last longer*"

9249

LINK-BELT SPEEDER

BUILDERS OF THE MOST COMPLETE LINE OF
SHOVELS — CRANES — DRAGLINES



LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.
(A DIVISION OF LINK-BELT COMPANY)

CONSERVE MATERIAL AND LABOR

OUR Insulated Joints are efficiently designed and accurately made—the product of many years of experience. Our fibre parts are designed by us, and manufactured under our careful supervision, to accurately fit the joints, and are of the best possible quality of material and workmanship.

With intelligent and careful installation and subsequent maintenance, the original fibre parts have been known to function satisfactorily for as long as ten years. On the other hand, improper installation and maintenance have resulted in some instances in reducing the efficient life of some fibre parts to as short a time as two months.

Proper care in the first installation and an intelligent amount of time and labor devoted to periodic inspection and maintenance, will avoid the excessive costs in material and labor involved in frequent renewals of worn-out fibres.

The following rules and methods have been recognized for many years by most railroads as being essential for the best results, and are published here in the interests of conservation of material, time and labor.

1. DO NOT APPLY AN INSULATED JOINT ON CUT OR BATTERED RAILS. They will damage the fibre, and by turning rails around or passing them by each other, good rail ends can be placed in the insulated joint.

2. BEFORE APPLYING JOINT, REMOVE ALL SHARP EDGES, SCALE, RUST AND DIRT FROM RAIL ENDS AND JOINT BARS. An application of clean oil to rail-ends and joint-bars, before applying, will help to resist rust and corrosion.

3. DO NOT HANG JOINT ON ONE RAIL AND HEEL OTHER RAIL INTO JOINT, as fibre is liable to damage.

4. DO NOT ATTEMPT TO APPLY JOINT WHEN THE OPENING BETWEEN RAILS IS TOO GREAT. Close up the opening until it is filled by the fibre end post. Otherwise damage results to the bolts and fibre bushings.

5. If it is necessary to force rails apart with a chisel, use one that is wider than the railhead and has a small taper. DO NOT USE A TRACK CHISEL.

6. DO NOT DRIVE A BOLT THROUGH A FIBRE BUSHING, or it will damage the bushing. If rails and joint parts are in proper position and bolt holes lined up, the bolts can be easily inserted by hand.

7. BE SURE THAT FIBRE END POST IS THE SAME SECTION AS THE RAIL; IF IT PROJECTS ABOVE TOP OF RAIL TRIM IT OFF CAREFULLY, FLUSH WITH TOP OF RAIL, BEFORE THE FIRST TRAIN RUNS OVER IT. This will prevent its being crushed and opened to the weather. An end post which is made slightly lower than top of rail will be free from damage by wheels and from the operation of removing lips from rail ends.

8. SUPPORT THE JOINT EQUALLY on smooth face, sound ties and keep the joint ties and shoulder ties especially well tamped at all times, with well drained, clean ballast. Otherwise, pumping and churning results in excessive fibre wear. If rails are laid on canted tie plates, a special abrasion plate, having the same cant, should be used on each tie under the insulated joint. Otherwise, the resulting twist given to the rails and joint under wheel loads will increase the wear on insulation and cause the base of joint to cut into ties.

9. KEEP ALL BOLTS TIGHT AT ALL TIMES, and tighten frequently after joint is first applied, until all parts get firmly set. The lower shoulder of the bars should be tapped all along its length with a maul when tightening bolts. This is to avoid a cocked joint and to secure even bearing on all insulation. In applying and maintaining joint, keep the two center bolts slightly tighter than the others.

10. POWER-WRENCH MUST NOT BE USED AT ANY TIME ON INSULATED JOINT, as it interferes with necessary mauling of base, and produces a cocked joint, and also is liable to damage bolts, washer-plates and other parts. ALWAYS USE HAND-WRENCH.

11. IF THE TRACK CREEPS SO AS TO REDUCE OR INCREASE THE OPENING BETWEEN RAIL ENDS, DRIVE THE RAILS BACK AND APPLY SUFFICIENT RAIL ANCHORS EACH SIDE OF INSULATED JOINT TO STOP THE CREEPING. Fibre cannot stand up against the crushing forces of creeping track.

12. IN REMOVING LIPS FROM RAIL ENDS, CARE MUST BE USED TO AVOID DAMAGING FIBRE END POST.

13. KEEP ALL JOINT PARTS DRY AND CLEAN WHEN NOT IN USE. Rusted bars and weathered fibre give poor results. Fibre will change its shape when exposed to weather or to considerable dampness when not confined in the joint. Such deformed fibre produces an ill-fitting joint, resulting in shortened life for the insulation.

14. HEAT-TREATING OR BUILDING-UP OF RAIL ENDS WILL BURN THE FIBRE AND RENDER IT UNFIT FOR FURTHER SERVICE. Either the insulated joint must be removed before doing such work, or all insulation must be renewed immediately after completion of work.

Printed copies of above rules are available, without charge, upon request.

THE RAIL JOINT COMPANY INC.
50 CHURCH STREET NEW YORK, N. Y.

FOR TAMPING

FOR CRIBBING

BARCO TYTAMPERS

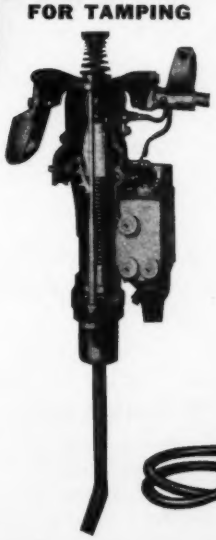
With 1943 railroad traffic already exceeding the peak traffic of 1942, it is today more than ever essential to help protect rail life by spot tamping joints and otherwise keeping the ballast in suitable condition.

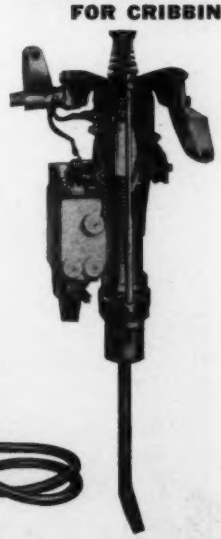
Barco Unit Tytampers being self-contained and easily carried by one man allow more time on the job, maximum production with resultant cost reduction and well tamped track that retains surface and alignment longer.

Maintaining track by tamping low spots is much more economical and satisfactory than repairing track that has been neglected. Barco Tytampers are suitable for spot tamping or gang tamping.

Now Used by 91 Railroads

Seven Years of Satisfactory Service





BARCO MANUFACTURING COMPANY

1805 W Winnemac Ave. NOT INCORPORATED Chicago, Illinois

In Canada THE HOLDEN COMPANY, LTD.

Montreal — Moncton — Toronto — Winnipeg — Vancouver

An Appreciation

This telegram, from Uncle Sam's Chief of Transportation, is an honor cherished by every Woodings-Verona Employee. It is accepted in the spirit of a pledge to accomplish even more in the stirring days ahead.

CLASS OF SERVICE

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R. B. WHITE, PRESIDENT

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SYMBOLS

DL = Day Letter
NT = Overnight Telegram
LC = Deferred Cable
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Ship Radiogram

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THE MEN AND WOMEN OF WOODINGS VERONA TOOL WORKS=
VERONA PENN=

YOU HAVE PERFORMED A SERVICE OF GREAT VALUE TO AMERICAN FIGHTING MEN BY HELPING TO EQUIP SEVERAL RAILWAY BATTALIONS FOR OVERSEAS DUTY WITH THE MATERIALS COVERED BY WAR DEPARTMENT CONTRACTS NUMBER TC998 AND 1080-43 PREVIOUSLY ACTIVATED RAILWAY BATTALIONS WHICH YOU HELPED TO SUPPLY HAVE BEEN THE BEST EQUIPPED IN THE WORLD THE TRANSPORTATION CORPS BELIEVES THESE LATEST UNITS WILL FARE EVEN BETTER BECAUSE OF YOUR GOOD WORK YOUR PRODUCTION IS A TRIBUTE TO YOUR PATRIOTISM AND YOUR ABILITY=

GROSS MAJOR GENERAL CHIEF OF TRANSPORTATION.

SINCE 1873

WOODINGS-VERONA TOOL WORKS, VERONA, PA.

SINCE 1873

CONCRETE helps railroads carry the war load

● Concrete is helping the railroads to keep main line tracks in heavy duty condition to carry the war load. Spreading the load with concrete makes smoother, faster tracks—cuts costs of maintaining soft roadbed.

Three ways to do this with concrete are:

1. FORCING CEMENT GROUT into water pockets and voids by pressure to stiffen the subgrade where it is weakest. No interference with traffic.

2. GROUTING SUBBALLAST in place at soft spots. This can be done without hampering train schedules.

3. PLACING PRECAST CONCRETE slabs under ties and ballast to strengthen track over poor subgrades.

All of these methods, which can be carried on without breaking track, are being used on American railroads now. For latest information on how concrete can help solve your track support problems call on us.

PORTLAND CEMENT ASSOCIATION

Dept. A8-27, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete ... through scientific research and engineering field work

BUY MORE WAR SAVINGS BONDS

"The Impossible" of a few brief months ago has happened. Railroad achievement in the war effort has far outstripped previous expectations . . . and, today, we have the miracle of transition from peacetime normalcy to mobilization as a war unit upon which depends the fate of nations throughout the world.

Without ado, without chaos, the rail systems of America have marshalled men and equipment for constantly doubling and trebling duty, assuming ever-increasing burdens . . . linking troops, munitions, and supplies with the definite strategy of Military and Government requirements . . . feeding essential materials to hungry war plants . . . accepting the added loads with willingness and determination.

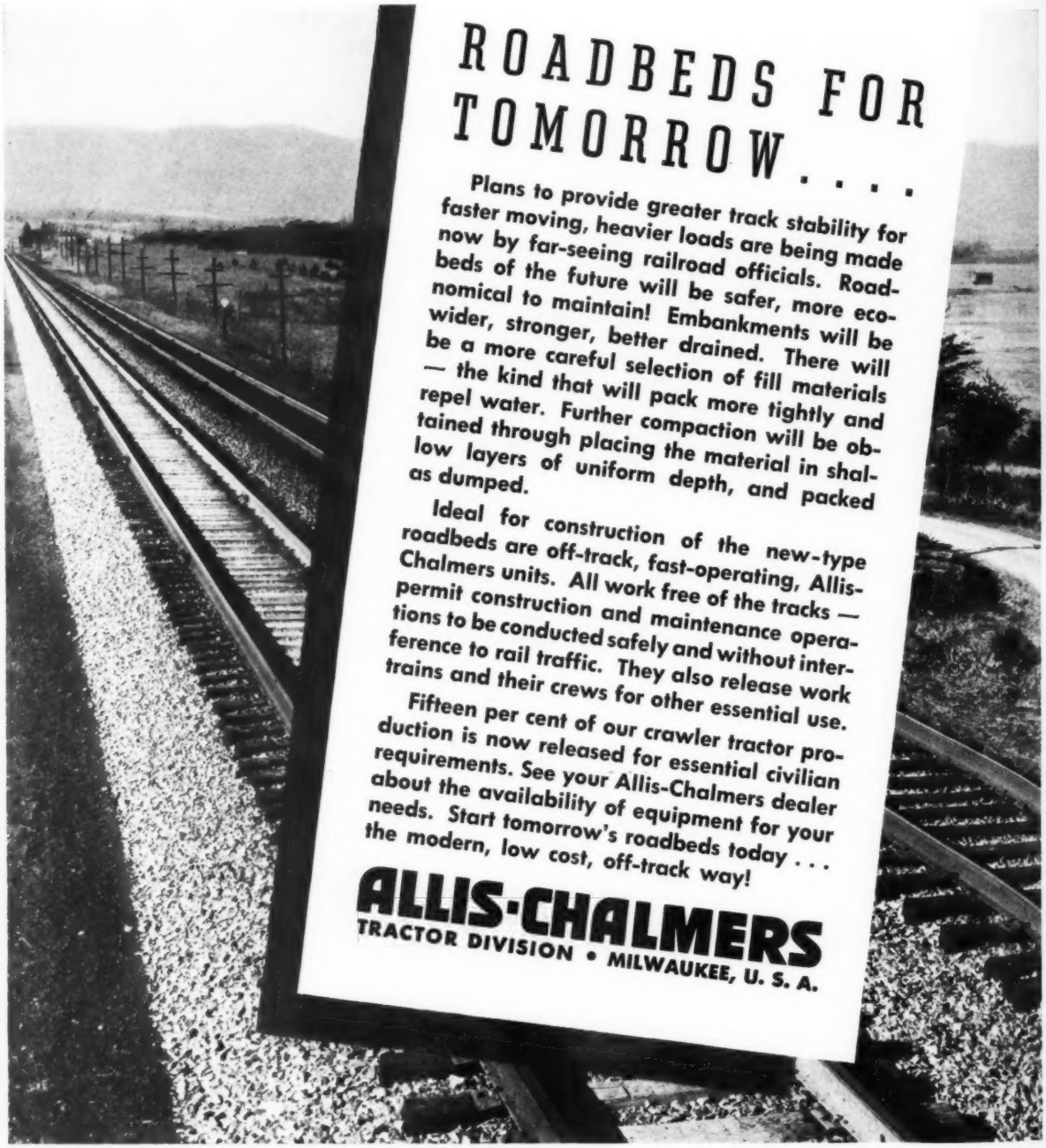
Backstage in this drama of tremendous growth in traffic, is the Maintenance Division . . . the men to whose keen vigil is entrusted the certainty and security against flaw and sabotage of the very foundation of the systems that must not fail. With this branch of railroad service, Fairmont is proud to cooperate with the furnishing of motorized equipment providing the utmost in dependability, safety, and comfort for the men engaged in every phase of maintenance work. Fairmont Railway Motors, Inc., Fairmont, Minnesota.

Fairmont

RAILWAY MOTOR CARS

Performance ON THE JOB COUNTS

OF ALL THE CARS IN SERVICE TODAY ★ MORE THAN HALF ARE FAIRMONTS



ROADBEDS FOR TOMORROW . . . .

Plans to provide greater track stability for faster moving, heavier loads are being made now by far-seeing railroad officials. Roadbeds of the future will be safer, more economical to maintain! Embankments will be wider, stronger, better drained. There will be a more careful selection of fill materials — the kind that will pack more tightly and repel water. Further compaction will be obtained through placing the material in shallow layers of uniform depth, and packed as dumped.

Ideal for construction of the new-type roadbeds are off-track, fast-operating, Allis-Chalmers units. All work free of the tracks — permit construction and maintenance operations to be conducted safely and without interference to rail traffic. They also release work trains and their crews for other essential use.

Fifteen per cent of our crawler tractor production is now released for essential civilian requirements. See your Allis-Chalmers dealer about the availability of equipment for your needs. Start tomorrow's roadbeds today . . . the modern, low cost, off-track way!

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE, U. S. A.

BUILD MODERN ROADBEDS THE MODERN WAY.. *Use Allis-Chalmers OFF-TRACK Equipment*

2-CYCLE DIESEL TRACTORS . . . for working with 2- or 4-wheel scrapers, bulldozers and trailbuilders, sheepfoot rollers, pull-type graders and other equipment. Handy, too, for spotting cars!

TRACTOR-SHOVEL . . . for any kind of digging and loading work. Handles ballast, digs ditches, widens slopes — loads into trucks or carries and dumps material.

MOTOR OR PULL-TYPE GRADERS . . . for quickly, easily handling grading work—from rough to finish. Ideal for making ditches, throwing up embankments or sloping.

Whether it is for section houses, construction crews, special training units—whether the housing is to be permanently situated or must be extremely mobile—Victory Housing Units fill every railroad housing purpose.

Completely pre-fabricated, portable and demountable, sturdy and long lived, Victory Housing Units are also amazingly economical, both in first cost and in upkeep.

Victory Housing Units are cool in warm weather, easily kept warm in winter because of the air space, insulated and ventilated double roof. A Unit goes up in six man hours time and is just as readily demounted for storing or transportation. Victory Units can be joined in any number of multi-units, through the use of connecting floor and ceiling panels.

And of prime importance today—Victory Housing Units can be delivered quickly*—ten to a freight car—from our plants at Dallas, Texas, where we have facilities to produce 500 a day. Write, wire or phone for prices and further information.

**Subject to Government regulations.*

TEXAS PRE-FABRICATED HOUSE & TENT CO.

Dallas, Texas • 1245 Shoreham Bldg., Washington, D. C.

MAKERS OF "VICTORY" HUTS AND "VICTORY" HOMES

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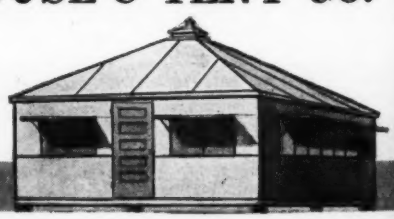
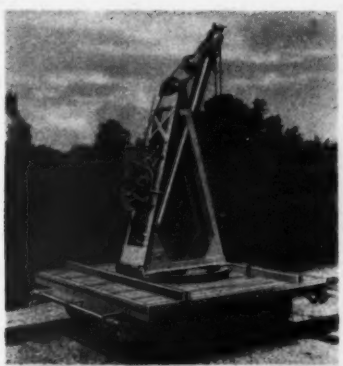
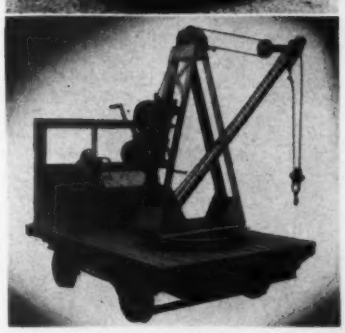


The KALAMAZOO "4"

This Derrick Car is an answer to the manpower shortage. It is a sturdily constructed utility machine which will safely handle heavy timbers, rails and stringers up to 3,000 lbs. The all steel frame trailer car is made extra wide so that material can be transported. The 7-foot boom with the swivel base (360° travel) permits operations on all sides of the car. The two-speed winch allows the operator to use the most efficient speed to handle the job, the low speed for heavy lifts and the high speed for light lifts.





Upper: Kalamazoo "4" Derrick Car mounted on trailer with boom in upright position.

Lower: Derrick mounted on self-propelled Kalamazoo No. 398 Bridge Gang Motor Car.

For further information send for bulletin D-4.

KALAMAZOO MEANS SERVICE TO YOU
ESTABLISHED 1883

Kalamazoo Railway Supply Co.
Manufacturers Kalamazoo, Mich., U. S. A.

No. 176 of a Series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: The Shortage of Paper

August 1, 1943

Dear Reader:

In my letter to you in our April issue, I told you of the War Production Board's action in the closing days of last December, requesting all publishers of magazines and newspapers and other users of paper to reduce their consumption 10 per cent. Although we began at once to develop ways to comply with this request, it was not possible to put these measures into effect until our April issue. At that time, as I pointed out to you then, we reduced the width of our page margins, eliminated unnecessary copies by renewing subscriptions more promptly after expiration, and by curtailing the use of extra copies for office use, and instituted other measures to reduce our demands for paper. The effectiveness of these measures is evidenced by the fact that through these means our six Simmons-Boardman publications, of which Railway Engineering and Maintenance is one, reduced their consumption of paper 15.05 per cent. In other words, we exceeded the reduction requested by 50 per cent, and thereby released more than 100,000 lb. of paper for other uses in these six months.

Other magazine publishers have made corresponding reductions, as a result of which the WPB has agreed, "in recognition of this fine record and the constructive co-operation rendered" by these publishers, to ask for no further reduction from them during the third quarter of this year. This action was taken in spite of the fact that a further order has been issued to newspapers, curtailing their use approximately 5 per cent further during the July-September quarter. This latter action is explained by the fact that the newspapers reduced their paper consumption only about 2½ per cent during the first half year.

But these curtailments by no means solve the problem. The steady reduction in the backlog of pulp wood demonstrates that further conservation is necessary. As a result, we are reducing the base weight of our sheet from 50 lb. to 45 lb. with this issue, thereby effecting a further reduction of 10 per cent. In doing this we have changed from a supercalendered sheet to an English Finish sheet to maintain the opacity and bulk that are desired, especially for the illustrations. In the measures that we adopted last spring, we endeavored to maintain the quality of our service to you, and in this we feel that we have been successful, for we have not received a single complaint from you. We hope that the further change that we are now making will be equally well received.

But the problem of paper conservation is not confined to publishers. Every user of paper—every railway and every railway supply manufacturer—can help by reducing its use (and inventory) of stationery, wrapping paper, cartons, etc. And every individual railway man can help also by decreasing his demands for bags, wrapping paper, etc. Only by this means can an adequate supply of paper be made available to insure the continued distribution to you of Railway Engineering and Maintenance and other essential media of information.

Yours sincerely,

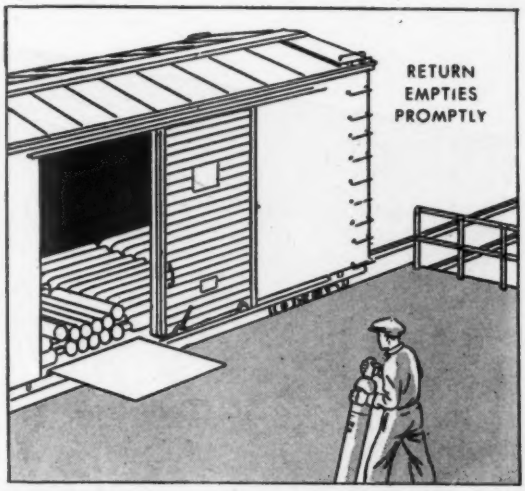
Elmer T. Howson

ETH:JW

Editor

MEMBERS: AUDIT BUREAU OF CIRCULATIONS AND ASSOCIATED BUSINESS PAPERS, INC.

Keep Cylinders Working

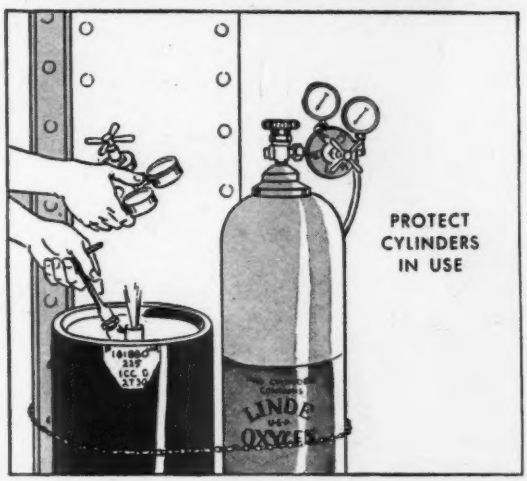


1. *Return empty cylinders promptly* so they can be refilled and put back to work with the least loss of time. Every day gained in cylinder turnover time is a day gained for war work.

2. *Reduce reserve stocks* of cylinders. This can be done by using all the gas in cylinders before drawing full cylinders from stock.

3. *Protect cylinders from damage.* Fasten them when in use so they cannot be knocked over. This will safeguard against damage to cylinders, valves and regulators. Replace oxygen cylinder caps when the cylinder is not being used. Don't use cylinders as rollers or supports.

4. *Keep oil and grease away* from cylinders. Cylinders that are so contaminated must be cleaned before refilling, — which adds days to the time they are kept out of service.



NOTE: Cylinder oxygen and acetylene can be supplied only when cylinders are available in which to transport them. For this reason, it is highly important to keep cylinders doing a maximum amount of work.

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
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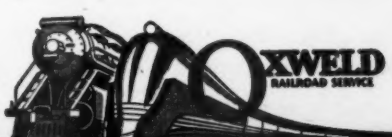

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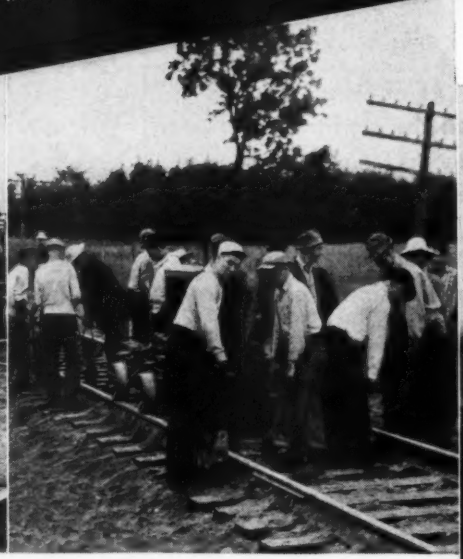

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Railway Engineering and Maintenance

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Railway Engineering and Maintenance

A New Day

For Railways After the War

The war news of the last month contains much encouragement. Although the end is not yet in sight, the initiative is now definitely with the Allied Nations and the Axis powers are on the defensive on all fronts. As a result, many leaders in government and in industry are beginning to look beyond the war to the conditions that will confront them when peace returns. And among these industries, few face more difficult problems and greater uncertainties than the railways. These problems will head up in the intensified competition that will arise.

Air—Highway—Water

With the rapid development of heavy aircraft during the war and the release of thousands of surplus units at its completion, it is only natural that many are thinking of the conversion of this equipment into cargo-carrying planes for freight and express. Also, a greatly expanded airplane building industry will necessarily seek new markets for its output, contributing to the expansion of the air passenger service beyond any previous level. And the release of hundreds of thousands of air-minded pilots to civil life will create an air-conscious public to a degree never before experienced.

On the highways, similar developments are in the making. New metals and new plastics forecast a revolution in automobile design that will produce smaller, lighter and more efficiently operated cars. Likewise, the development and use of high octane gasoline in airplanes will extend to automobiles, resulting in more miles per gallon and lower costs of operation.

On the water, the meteoric increase in shipbuilding capacity from a maximum of 5,500,000 dead weight tons in 1941 to 20,000,000 tons this year forecasts a return of ships into coastal competition on a scale never before experienced.

New Methods Essential

All these conditions spell but one thing for the railroads—the necessity for so revising all their activities that they may offer new services comparable with or better than their competitors at costs attractive to patrons. To devise such means, the A.A.R. has organized a committee that is giving intensive study to post-war problems. Individual railways, notably the New York Central, the Pennsylvania and the Missouri Pacific, are creating similar organizations to analyze their individual problems. This movement is highly encouraging. It warrants expansion.

What these committees are doing in organized ways, every railway man can afford to do individually. Nowhere is this more important than in the maintenance of way department. In the nature of its standards it will do much to establish limits for the service the railways can render—as, for illustration, in curvature and in strength of track construction. Equally important, the efficiency with which it will conduct its operations will be reflected in the total cost of railway service, for one of every six dollars spent by the railways goes for roadway maintenance.

The railways will face new conditions after the war. They must meet them with new services, new efficiencies. And in so doing, maintenance forces must and will do their full share.

Maintenance Men—

Hold Vital Place in War Effort

IN THE intensive competition that exists for the available manpower of the country for military service, for war plants and for other essential industries, the railways are at a distinct disadvantage in several respects, and for this reason will continue to lose men, regardless of any attempts to hold them. But one thing is certain, and that is that no railroad need lose loyal and patriotic workers because of any feeling on their part that they can contribute more directly to the war effort in the armed forces, on the farm, or in some war plant, if those supervisory officers charged with the responsibility for maintaining adequate war-time rail transportation meet that responsibility and convince these men that, today, there is no more vital war job than on the railroads—that without their efforts to maintain the railroads on the home front, there can be no successful fighting front, and that even the safety of our shores might be in jeopardy.

When thousands of patriotic maintenance men laid down their tools at the first call of the armed forces, the railways themselves were the first to cheer. At the same time, recognizing the need, they exercised little restraint upon their men who sought to leave for employment in war plants, and even recommended many of their most experienced men for key positions in the construction of army camps, arsenals, munition dumps, ordnance plants and other war facilities. This is as it should have been, and there may be other compelling needs which neither the railroads nor their men can afford to ignore or turn down. However, having done their part in this respect, and most generously, it would be in the disinterest of their country for the railways to encourage further unstrained defections among the men in their maintenance forces who may feel the urge to greater service elsewhere. These men must now be shown that there is no greater need elsewhere—no chance for greater service.

As early as last fall, speaking before the Roadmasters' convention, F. R. Layng, chief engineer of the Bessemer & Lake Erie, said to those present, "You men with your specialized training have an opportunity such as you have never had before to render service—more important to my mind than if you were in combat service." At another point, still referring to track maintenance men, Mr. Layng said, "It is for these reasons that I do not hesitate to emphasize the importance and value of the work under your charge, and to assert that, in my judgment, you can contribute more to the war effort in your own field than if you were in the armed forces."

And Mr. Layng was not alone in his appraisal of the vital role being played by maintenance men, because, opening the meeting, C. E. Johnston, chairman of the Western Association of Railway Executives, and at the time also associate director of the Western region of the Office of Defense Transportation, said, "Our task in winning the war will be the greatest and most difficult we have ever known. It will be even greater and more difficult tomorrow than it is today. Your part in the struggle—the safe and adequate maintenance of the roadbeds and tracks of the railways—is second to none in importance."

Carrying that thought still further, W. W. Kelly, at the time director, Section of Materials and Equipment, ODT, said to those present, "Your contribution is as necessary to victory as that of our armed forces. This war cannot be won without adequate transportation."

These were not idle words of eulogy to maintenance men—they were words of significant truth and inspiration, spoken with a deep sense of responsibility by men in positions to know the essential part that the railroads must play in the war effort of the country if that effort is to be successful, and of the essential part that maintenance men must play if the railways are to be adequate to the task. True and justified at the time they were spoken, these words have even greater significance today. In the light of the tremendous load and responsibility that have been placed upon the railroads, there is no place in the war picture today where maintenance men can render a greater service than on the railroads, backing up the country's already huge armed forces and war production. Rather than be dissatisfied with their part in the war effort, maintenance men should derive inspiration in the part they are called upon to play, and with resolve should stand by their roads and play their part still more earnestly to the best of their ability.

Slow Orders—

Should Still Be Put on New Rail

IN recent years many roads have followed the practice of giving up one track on multiple-track lines during working hours to enable maintenance gangs to lay rail or install ballast without the interruptions and loss of constructive time caused by the passage of trains. Obviously, this diversion of traffic caused some delays to trains, but these were seldom serious and, in general, they were considered to be less costly than the loss of time by the gang; besides, the arrangement reduced the time required to complete the work and thus shortened the period of interference with traffic. More recently, the increasing number of trains, as well as the higher average speeds at which most of them are being operated, have made it necessary, in many cases, to discontinue the practice of "killing" one track and diverting traffic to other main tracks.

When the diversion of trains is discontinued, the rail must be laid under traffic. In this event some delays to trains must still be expected, for otherwise, the newly-laid rail may receive damage from which it can never recover, and which will not only shorten its life, but will increase the difficulties of maintenance as long as it remains in service. In addition, both gage and line may be distorted enough to require a major amount of work to restore them to the standard to which they should be maintained.

Although it is desirable that the old rail be surfaced and lined before it is removed, in order to insure good line and surface for the new rail, this is not always done. In any event, some of the old rails are likely to be surface bent, and some joints will be low. The new rail will lack support at these points and may be bent permanently if trains are allowed to pass over it at full speed before it can be given the needed support.

Furthermore, neither the rail nor the tie plate becomes

fully seated until one or more trains have passed over them. In fact, tie plates with ribbed, corrugated or stepped bottoms do not become seated fully until a number of trains have passed over them. Since low speeds do not cause lateral thrusts against the rail, they permit vertical settlement of the tie plates and thus avoid distortion of either line or gage. However, if normal speeds are permitted immediately, many of the plates will not settle vertically, with the result that irregularities will be introduced into line and gage, which will be difficult to eliminate. As every experienced trackman knows, it is no easy matter to move corrugated-bottom tie plates the small distance involved in regaging, and it is still less easy to hold them in position after they have taken their final settlement, or event after partial settlement.

Schedules should never be interfered with unnecessarily at any time, and delays to trains are less permissible now than in normal times; yet the importance of avoiding damage to rail and of eliminating the consequences of such damage is so great that the few minutes delay to each of a limited number of trains by a slow order, placed temporarily, can be fully justified by the protection thus given the new rail. What the speed restriction should be must be determined for each case individually, but in any event, it should not be higher than 30 miles an hour, and in many cases considerably less.

Personal Injuries—

Largely Have Commonplace Origins

FEW personal injuries are unavoidable. It may be that no reasonable action on the part of the victim himself would have averted the accident, but traced to its source, someone, through carelessness or inattention, did something he should not have done or, more likely, failed to take a needed action. Failure to take a nail out of a scrap board before discarding it has caused more than one death; a multitude of sightless eyes testify to carelessness about wearing goggles; worn shoes and rundown heels have made permanent cripples out of men who have thus lost their surefootedness.

Obviously, the necessity for keeping the men in his gang alert, without those moments of inattention that are so productive of accidents, places a responsibility on the foreman, who must also see that the work is done in accordance with standards. The present necessity for employing inexperienced men to replace those removed by war activities places still more responsibility on the foreman, who must not only instruct the new men how to do their work, but must also instill the principles of safety in their minds and teach them to follow these principles.

To keep the men in a gang safety minded and alert to avoid injury, and this includes the experienced as well as the new men, the subject must be kept before them constantly, and the only man who can do this is the foreman, for no one else is with the men so constantly or knows them so intimately. His task will be made far easier, however, if he has the whole-hearted support of his supervisor and of the division officers, and particularly if the men are aware of this fact.

One of the things to keep in mind particularly is that few personal injuries have spectacular accompaniments, for most of them arise from commonplace causes, some of which have been mentioned. Loose or torn clothing worn around a power machine, dull tools, burrs on spike mauls, sledges or chisels, an insecure chuck in a drill or reamer, failure to fasten a rotary brush or a chipping blade in the chuck, a wrench with worn jaws, a loose board on a scaffold and carelessly-tied knots, have all resulted in severe injuries or fatalities.

Safety instruction is made more difficult by the very fact that so many personal injuries spring from such trivial causes. The foreman who is most successful in his instruction is the one who can personalize these causes and thus arouse and hold the interest of the men. If he is able to do this, and at the same time make the experienced men feel a responsibility for the new men, they will help him with his teaching.

Inspection—

More Necessary Now Than Before

FROM the beginning, inspection has held an important place in railway maintenance. The practice of employing track walkers grew out of the menace created by "snake head" rails, which began with the iron straps and continued through the lighter sections of iron rail. In time, better track was developed, but for many years cars and locomotives increased in size so rapidly that the track always lagged behind them. At the same time, increased train speeds added to the burden on the track, and the system of track inspection, as it had developed, was continued as a necessity.

Both track and bridges have now caught up with the cars and locomotives; yet both must withstand the wear and tear of a service that often borders on abuse, as a result of which they are often afflicted with a variety of defects. Substantially every defect that appears in track affects its riding qualities. While defects in bridges may not do this initially, if they are not corrected they may become hazards.

Today, the density of traffic and the average speed of trains have increased beyond the experience of any maintenance officer. As a result, small defects are occurring with greater frequency and, when left alone, are developing into larger defects much more rapidly. Obviously, it has become a prime necessity, therefore, to find these small defects and correct them before they grow into larger ones; but this discovery can be made only through systematic inspection.

Experience has shown not only that inspections of track and bridges must now be regular and systematic, but that they must be thorough and detailed. In the past, much of what passed for track inspection was superficial, for only those defects that were most obvious were given attention, because it was not considered necessary to spend time to correct isolated defects until they became clearly evident. So much importance now attaches to conserving materials in service, to moving trains without delay, to the maintenance of smooth riding and to the removal of every form of hazard that no defect should be allowed to progress beyond the initial stage, but effort should be made to discover it at once and correct it as soon as possible after it has been found.

General View of the Plant, With Pioneer 38-V Unit (on the Flat Car) in the Foreground

Adapting Ballasting Methods to Today's Problems

Under the pressure of heavy traffic and the wartime shortages of equipment and labor, the Soo Line has speeded up ballasting operations through the use of a semi-portable crusher and mechanized surfacing gangs, which have increased efficiency, reduced the use of train service and ballast cars, and given better work

TO SECURE a better grade of ballast which will withstand the "beating" its tracks are receiving from war-time traffic, the Minneapolis, St. Paul & Sault Ste. Marie is now operating a semi-portable crushing and screening plant to supply large mechanized surfacing gangs. The use of this plant provides improved ballast at reasonable cost. A feature of this ballast processing plant is its flexibility of control of output and its portable character which makes it possible to utilize pits located close to the surfacing gangs, thereby securing additional savings from a shortened line haul and also conserving train service and cars, now badly needed for the record volume of war-time traffic.

Conditions on the lines of this road in Wisconsin are especially favorable for the use of a semi-portable ballast processing plant, since this territory has numerous glacial deposits of gravel, some of which are almost ideal for processing into gravel ballast. Most of the gravel deposits in this region have about 30 to 50 per cent sand and the remainder of the pit run gravel ranges in size up to 10 or 12 in. in diameter.

Previously, this road had been using mine-run gravel from pits purchased by the railroad and occasionally had also purchased commercially prepared gravel. The latter was expensive, while the mine-run gravel was unsatisfactory, because it contained a large proportion of rocks that were too large for ballast and a considerable amount of clay, which soon caused the ballast to cement and the ties to churn. In addition, trouble was frequently encountered in unloading mine-run gravel because the large boulders caused the cars to derail.

Suitable Gravel Found

As a result, this road had been prospecting for several years for a new source of suitable gravel ballast. Many pits were found, but tests disclosed that the gravel in most of them was unsuitable either because the rock was too soft or they contained clay. Two large deposits of suitable quality were finally located and purchased; one called the Colgate pit, at mile post 112, near Waukesha, Wis., on the main line in southern Wisconsin, and the other, the Coolidge pit, in the Ore district of northern Wisconsin, near Mellen, Wis. The Colgate pit consists of about 80 acres, with about 9 ft. of overburden and a 100-ft. depth of gravel. The Coolidge pit occupies about the same area and has about 5 ft. of overburden and 40 ft. of gravel. The gravel in these pits, which were opened last year, is exceptionally free of clay and the rocks are hard and range in size up to about 12 in. in diameter. The proportion of sand runs about 40 per cent, which is desirable on this road because much of the spot surfacing is done with trowels from the ends of the ties. Because it is free of clay, the gravel at these pits does not need washing if the overburden is removed carefully. Late in 1942, it was decided to process this gravel by crushing and screening to improve the percentage and angularity of the rock in the finished ballast for it was found that the processing and loading of the ballast could be done for only a little more than the cost of loading alone and would save considerable ballast and labor here-

tofore wasted by throwing out large rocks during the surfacing operations with mine-run gravel.

Accordingly, a contract was awarded the E. W. Wylie Company, Inc., St. Paul, for processing and loading about 2,000 cu. yd. of gravel ballast daily. For this purpose the contractor purchased a semi-portable Pioneer crushing and screening plant. Because of its portable nature, the equipment can be moved by the railway between the Colgate and Coolidge pits, as needed. A reasonable price was obtained from the contractor, based on the continuous day and night use of this modern equipment, which was about 50 per cent of that for commercial gravel purchased locally.

The ballast processing plant is operated two 11½-hr. shifts each day and produces an average of 50 carloads, or 2,000 cu. yd., of ballast daily. Two surfacing gangs are organized on the basis of using the minimum output of the plant, so that no delay will occur to their operations. The excess ballast from the plant is shipped to section gangs for "patch" or spot surfacing programs.

Modern Ballast Processing

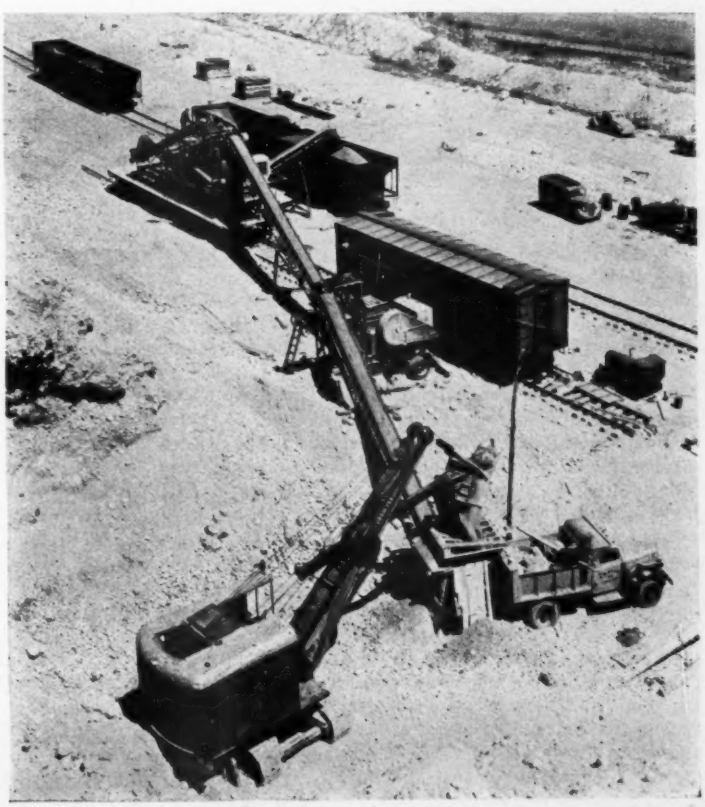
The ballast processing plant consists of a loading hopper, a large primary jaw crusher mounted on pneumatic tires and a 38-V Pioneer unit mounted on a flat car. The units are connected by 24-in. belt conveyors. The loading hopper is loaded by a 1¼-yd. Lorain 75-B shovel and has grizzly bars on the top, set to reject boulders larger than 10 in. in diameter. Only about three cubic yards of oversize boulders are discarded every 24 hr. The remainder of the gravel is fed through a mechanical feeder at the bottom of the loading hopper onto a 24-in. belt conveyor 60 ft. long, which carries the gravel to the large primary jaw crusher. This crusher is set to crush the rock to a 3-in. size. The primary crusher has an apron-type feeder and a grizzly, which permits the small gravel to by-pass this crusher. From the bottom of this unit, a 24-in. belt conveyor 40 ft. long carries the gravel to the Pioneer 38-V crushing and screening unit. This unit has a triple-deck vibrating screen; two crushers, a jaw-type crusher and a secondary roll crusher; and a 24-in. belt delivery conveyor to the ballast cars. The return system between the crushers and screens in this unit also consists of 24-in. belt conveyors. Two Diesel power units operate the plant; a Caterpillar D4600 power unit, mounted on the primary crusher, operates the mechanical feeder on the loading hopper, the conveyor to the primary crusher and the primary crusher itself; a Caterpillar D13000 power unit, mounted on the Pioneer 38-V crushing unit, operates that unit and the other belt conveyors.

The mechanical feeder on the loading hopper regulates the flow onto the conveyor to the large primary jaw crusher, providing a uniform flow throughout the plant. The material from the primary crusher is delivered to the bottom screen of the vibrating triple-deck screen of the Pioneer 38-V unit. This screen retains material larger than 2 in. in diameter while the material passing through goes directly to the finished product hopper, from whence it is delivered to the ballast car. The lower end of the bottom screen is a by-pass screen further separating the rocks to be crushed, the larger sizes going to the jaw crusher of this unit and the smaller ones directly to the roll crusher. The size of openings in the by-pass screen may be varied by substituting other screens to equalize the load on the crushers. All crushed material is fed by a return conveyor system to the top deck of the vibrating screen and all material that is still oversize goes to the roll crusher for further reduction. The remainder falls onto a blank plate between the top and bottom decks of the screen and is by-passed around the bottom deck directly to the finished material hopper.

Both the primary jaw crusher and the 38-V unit are ruggedly constructed with rigid all-steel frames and are equipped with Timken and SKF bearings, steel castings, heavy-duty belting and Alemite lubrication. By varying the size of screens and the crusher openings, any size or variation in the size of the crushed product can be obtained and, in addition, an extra ½-deck screen can be added to the 38-V unit for sand rejection. Thus this plant may be adapted to the processing of any type of mine-run gravel to produce a ballast of the required characteristics.

Can Be Equipped for Washing

This plant can also be equipped for washing the ballast although this has not been necessary because of the cleanness of the ballast. As previously explained, great care which is taken in removing the overburden and also in discarding any material which shows evidence of a clay content. Likewise, a sand rejection screen has not been used because a gravel ballast with about 40 per cent sand is considered acceptable, especially if the remainder of the ballast has a good



Overhead View of the Plant From the Top of the Ballast Pit Face

Close-Up of the Large Primary Jaw Crusher

proportion of crushed particles with high angularity. This is readily secured because about 25-30 per cent of the pit-run material runs to oversize which has to be crushed. Although the plant is set to produce gravel with a maximum size of 2-in., a further increase in fractured angularity in the ballast by crushing the oversize to 1-in., instead of 2-in., is being considered.

This plant will load a car of ballast every 15 to 19 min. The average time while operating is about 17 min. Some delays occur when the hopper and other units must be moved and occasionally for minor repairs. The first hour of each shift is spent oiling, and adjusting the equipment. The highest loading record for one shift is 32 cars. For emergency production, the plant can be stepped up to a capacity of about 150 cu. yd. an hour. The total time lost for major repairs, etc., in May and June was 3½ days, or slightly more than 5 per cent of the time the plant was in operation.

At the Colgate Pit

The remainder of the discussion of ballast processing with this plant will be confined to the methods used at the Colgate pit where the plant was first set up and operated from April 19 to June 16 of this year, then being moved to the Coolidge pit for the remainder of the season. At this pit a loading track 3,000 ft. long was constructed with a two per cent grade along the pit face, providing a gravity loading track. This track provided space for more than 25 cars above the pit face. The Pioneer 38-V unit, which is mounted on a flat car, was spurred out parallel to the loading track and the primary jaw crusher was blocked in position. The ballast cars were spotted under the loading conveyor and moved out ready to be picked up, by releasing and applying the hand brakes. Usually, 50 cars were set out daily, 25 each morning and evening, at the same time the loads were picked up. The cars used are 40-cu. yd. multi-service ballast cars with both side and center dump controls, which are also used in revenue service for hauling coal in winter.

As the shovel worked along the pit face, it was used to move the loading hopper and the jaw crusher as necessary. The flat car unit was moved ahead by taking up rail behind and laying it ahead. Although this pit has a depth of 100 ft. of gravel, only a 60-ft. face is worked now. The belt conveyors between the units enable the shovel to work out as far as 150 ft. from the plant track. Working a 60-ft. face for a width of 150 ft., it was seldom necessary to move the flat car unit, while the loading hopper, primary jaw crusher and conveyors were quickly rearranged as needed to the position desired. As a safeguard against a breakdown or delays for repairs, the contractor had an extra shovel (a Lorain 1¼-cu. yd. 75A), an electric welding generator and an oxy-acetylene welding outfit.

In moving from one pit to another, the primary crusher, gravel processing plant, two shovels and other equipment were loaded on four flat cars, including the car on which the 38-V unit itself is mounted.

Ballast Plant Crew

The ballast plant is operated by a foreman, who is in charge of both shifts, and a crew of 7 men on each shift, or a total of 15 men. A crew consists of one crusher plant operator, one mechanic, two car runners, one shovel operator, one grizzly operator and one pitman, who pulls down ballast to prevent a cave-in or slide, does blasting if necessary, and also does other work. The approximate payroll of this crew per week, not including the foreman's salary, is $1,016. The hourly rate varies from 65 cents to $1.25 an hour. Both crews work seven days a week, 11½ hr. a day, and are paid time and one-half for all time over 40 hr. per week.

The railroad exercises close supervision over the plant to insure quality production. The contract was made on a flat price per yard, with a provision for a reduction if the contractors' costs were below a certain figure. In spite of this, however, the emphasis is placed first on the quality of the ballast produced. The contract price represents a large saving over the cost of commercial gravel and further savings are being realized by the reduced road haul. During the fall, after the ballast plant is shut down, the overburden is stripped for next year's operations. A shovel and trucks are used for this work, the overburden being dumped on land nearby, which was purchased for that purpose.

Program for Surfacing

Based on the output of this ballast processing plant, a program was set up in 1943 for surfacing 39 miles out-of-face in southern Wisconsin and also for providing 425 carloads of "patch" ballast from the Colgate pit and for surfacing 27 miles out of face in northern Wisconsin and providing 325 carloads of "patch" ballast from the Coolidge pit. It was originally planned to use two gangs of 75 men each, which could just about use the entire daily output of the plant. However, this was modified later in the season as it became more difficult to keep the gangs filled up.

In fact, the labor situation soon became so bad that the gangs were hard pressed to do much more than get the ballast under. As an example, one gang started out with 85 men and was soon down to 50. Another started with 50 and was soon down to 40. Later, in early summer, the forces were augmented by the addition of high school boys, who were provided with separate bunk cars. These boys were used principally for ballast dressing and lining work.

As a result of the labor situation, the surfacing methods were modified. The track was not skeletonized except at bridges, road crossings, station grounds and other points where the raise was limited. Instead the old ballast shoulder was plowed off at the ends of the ties, the new ballast was spread and the track was given one single raise of an average of 6 in. and a maximum of 9 to 10 in. This surfacing is done to ballast stakes and is not followed by a light finishing surface, but rather by a spotting and lining gang to smooth up irregularities. In addition, although each gang is equipped with an eight-tool power tamping outfit, because of the short-

age of manpower, four-face tamping, rather than eight-face tamping was used in this work.

Gang Organization

A typical surfacing gang organization during the early part of the summer, after the gang had been augmented by the addition of 35 high school boys, was as follows: 1 general foreman and 3 assistant foremen were in charge, with the general foreman and 1 assistant foreman supervising the surfacing work, 1 assistant foreman in charge of ballast dressing and the other in charge of lining work. The surfacing gang consisted of 1 man digging jack holes, 1 man moving and setting up the spot board, 1 man operating a Nordberg power track jack, 4 men with shovels tamping a tie at each raise made by the jack and 2 men with shovels filling in ballast for the jack tampers. These latter men also had sledges which were used to knock down the track if the raise was too high. One man handled the level board at the jack. The assistant foreman sighted the lift.

Ten men followed breaking down the ballast in the tie cribs and filling in for the tampers. Eight men were used in the tamping crew, operating four Jackson tamping units, powered with an eight-tool Jackson power unit, mounted on a push car. The 8 tamper operators, worked four at a time and alternated on the tampers every two rail lengths. The four tampers were used in four-face tamping, two on one side of the tie inside the rail, and two on the other side of the tie outside the rail. In this form of tamping, the men on each side of the track start close to the rail, tamping under the rail against each other and then work away from the rail to the end of the tie and to a point 17 in. inside the rail. Two men with shovels filled in additional ballast for the tampers as needed. One machine operator was assigned to the power unit. This man made adjustments as needed and, in general, cared for the power unit as well as the tamping units.

Four-Face Tamping With Jackson Electric Tampers

Two flagmen were stationed a mile from the gang. The gang also had one water boy, a camp attendant who cleaned up the outfit cars during the day, and a night watchman to protect the tools, all of which are left out at night.

After the surfacing, more ballast was unloaded as needed for dressing and was dressed by an assistant foreman and 20 boys with shovels. The cribs were dressed full in the center of the track and sloped down to a level two inches below the top of the ties at the ends. This gang did not dress the shoulders. Later, a Burro crane with heavy-duty push cars and dump boxes was used to equalize the ballast along the shoulders, which were then dressed with a ballast shaper (an old Jordan spreader converted for this purpose).

Making a Raise With a Nordberg Power Jack

The lining gang consisted of an assistant foreman and 12 boys with lining bars. The assistant foreman used a transit for lining tangent track and the curves were string-lined. This work was followed in about two weeks by spotting crews who corrected any irregularities, using bars and shovels for tamping.

With this organization, about 1,750 cu. yd. of ballast was used per mile for an average 6-in. raise. Formerly, about 400 cu. yd. more ballast per mile was required with the mine-run gravel, since so many large boulders were thrown out by the men while surfacing.

No provision was made in this work for joint reconditioning since this was done the previous year under contract by the Oxweld Railroad Service Company and the Teleweld Co., Inc. At the time the rail ends were welded, fishing wear was compensated by turning the joint bars and by applying rail joint shims. On this road a regular program of joint welding is planned each year, to be followed by surfacing out-of-face in that territory the following year.

Tie Renewals Before

Tie renewals are completed in advance of the surfacing, by tie gangs equipped with Woolery tie saws. The experience of this road has indicated that renewing the ties during the surfacing is uneconomical as compared to the cost of renewing them beforehand with mechanized tie renewal gangs, because the tie renewals slow up the progress of the surfacing. About 275 ties are renewed per mile in territory where the track is to be surfaced out-of-face, as compared to a normal average on this road of about 141 per mile.

The track surfaced out-of-face in the vicinity of Waukesha has 39-ft. 100-lb. rail laid in the period from 1925 to 1927. It has six rail anchors per mile, four-hole 24-in. joint bars and staggered joints, is fully tie plated and has an average of 24 ties per 39 ft. rail length.

The Soo Line is well pleased with the results obtained to date with its ballast processing plant and mechanized surfacing gangs. The ballast processing plant is producing a better grade of ballast at reasonable cost and the mechanized surfacing gangs, in spite of modification necessitated by the labor shortage, are producing a good quality of work. This work was done under the general supervision of T. Z. Krumm, chief engineer, Minneapolis, Minn., and J. B. Kelly, general roadmaster, Stevens Point, Wis.

Because of a Shortage of Locomotives, as Well as Cars, Use of Work Trains Must Be Kept to Minimum

Railways Face *Maintenance*

By W. D. Beck

District Manager, Car Service Division, A.A.R., Chicago

IT HAS been my experience that the more widely information with respect to railway car problems is placed in the hands of maintenance of way men, the more readily will help be forthcoming to care for the tremendous traffic now being offered the railways, not only by war industries but by shippers generally. For this reason I welcome the opportunity to outline the situation as it now exists and is in prospect, and to suggest some of the things that can be done to increase the use of cars in revenue service.

First of all, it should not be overlooked that the number of units now capable of handling freight is much below the number in service during the last war, although, from the standpoint of car capacity, we are much better off than the number of cars alone might indicate. On the other hand, it is with difficulty that the railways are able to provide the equipment called for by shippers in these days and there are times when we are close to a car shortage.

Railway labor supply is in the same critical situation as all industry. This situation has interfered materially with the release of cars by shippers, although through the efforts of our vigilance committees much assistance has been given. By reason of this vigilance organization, the car service division has been able to keep in touch with and urge the release of cars all over the United States. These vigilance committees, composed entirely of representatives of industry, have been organized by the shippers advisory boards throughout the nation and are advised every week, by the district managers of the car service division, of the condition of every industry in their areas.

As a matter of fact, many of the vigilance committees obtain this information from local agents, so that they are in possession of it as quickly as the district manager is. Immediately, they use the authority given them by the advisory boards, either directly, or by telephone or letter, to get after any one who has failed to release cars promptly, so that each shipper may be able to obtain his quota of cars for further transportation needs. Industry in general, and these committees in particular, has done a remarkable job of releasing cars, and the percentage of cars delayed beyond 48 hours, in either loading or unloading, has been reduced almost miraculously within the last year, to from 7 to 20 per cent of the former 48-hour loads.

With this shipper accomplishment as an example, it becomes of still greater importance that company material be given the utmost consideration. That company material presents a problem of no small magnitude with respect to the number of cars tied up, is indicated by figures from the latest monthly report available covering all of the roads in the United States.

Too Many Cars Tied Up

This report shows 36,846 cars of coal and coke on hand, representing, on individual roads, a supply sufficient for from 1 to 26 days. The car service has maintained consistently that in some areas, especially those close to coal mines and coke-producing plants, this total is entirely too large and that it can be reduced at least 50 per cent with safety, especially at those points where the fuel can be obtained in one or, at most, two days. Obviously, the maintenance of way department does not have the same direct interest in coal and coke as it does in some other classes of company material; nevertheless, there are points where the officers of this department are vitally interested. On this basis, I not only urge but beg these officers to keep this matter constantly in mind. If it is not their personal responsibility for an over-supply of fuel in cars, they still should bring it to the attention of the proper officers, for it is a situation that cannot be defended in the face of the fact that some industries are not getting all of the cars they need for the shipments of their products.

When we turn to other items of company material, we find that on the same date there were 9,749 cars on hand containing track and bridge materials and other items that go into the operation of a railway. The average delay to these cars, as before on individual roads, runs from 1 to 12 days. Here too, the car service division believes that if there were

a Car Shortage—

Men Must Help

In this paper, which was presented at a recent meeting of the Maintenance of Way Club of Chicago, Mr. Beck pointed out the seriousness of the situation with respect to cars, which is confronting the railways at this time. With a traffic that is already larger than any transportation agency has ever before been called upon to handle, and which is still increasing, less cars are available than for many years. In setting forth these facts, Mr. Beck urged every maintenance officer to make the maximum effort to release promptly all cars of company material

Ballasting Operations Should Be Scheduled Carefully to Use a Minimum of Cars That Are Suitable for Revenue Service

greater diligence in ordering material only as it is needed, or as it can be unloaded, and still greater diligence in releasing these cars from load promptly upon arrival, we would be able to augment the car supply still further.

Without mentioning any particular road, but reading from the record, it is observed that one carrier had on hand, exclusive of coal and coke, 1,514 cars, with an average delay of 11 days in unloading; another had 356 cars with an average delay of 5 days; and still another had 258 cars with an average of 3 days delay; and a fourth road reported 453 cars under load at destination an average of 4 days. When we get down to some of the smaller roads, the record is equally unsatisfactory. For instance, one of these showed 6 loads on hand an average of 7 days, and another reported 82 loads delayed an average of 3 days. Still more cases can be cited, but these are sufficient to indicate that there is ample room for improvement.

Considering the special activities of the maintenance of way department and its problems, there is first the matter of ordering materials in advance of the time they will be needed. I do not wish to point to any particular road or to any one department, but can say specifically that the record is susceptible of decided improvement, because cars containing company materials are being held from 3 to 10 days while storage facilities are being prepared for the materials, while labor is being found to make unloading possible or while train service is being arranged to handle the cars and permit the unloading to be done.

Using Cars for Storage

At this point the age-old question arises of using cars for storage purposes, instead of unloading them immediately upon receipt. The records in this respect are so unqualifiedly bad that it is safe to say that this practice is the prime car delayer. It is used as an excuse far too often, sometimes by claiming a labor shortage; sometimes by charging inefficiency in train service; but it usually resolves itself into the fact that someone either failed to see the necessity for any extra effort or was not informed concerning the loss in the use of the equipment by reason of the cars being held under load.

Another disappointing manner of handling revenue equipment for railway purposes is that of using serviceable cars for the storage of tools and supplies, even though company service cars may be available into which they can easily be transferred. It has been observed in not a few instances that such commercial cars are tied up in wrecking outfits or for maintenance of way purposes merely because those in charge were not aware of the urgent need for the equipment, or were careless about the matter. One of the most flagrant forms of misuse of cars, and this is generally done as a matter of expediency, is the use of a gondola or a flat car for the shipment of materials that might just as well have been loaded into stock cars or third-class box cars. I doubt whether there is a man in the maintenance department who has not seen many flat cars, each carrying one frog, two or three rails or, perhaps, two or three wheels, and in some instances this completely inadequate loading has kept a car out of commercial service for days and days.

In view of the urgent need for flat cars and gondolas for the shipment of impedimenta, such use of cars of this type is not only unwise but tragic, and I urge strongly that every man involved in the loading of cars be imbued with the absolute necessity for stopping the loading of these cars. It has also been observed too often that first-class commercial

hopper cars are used for handling cinders, either at locomotive cinder pits or in the country, notwithstanding an adequate supply of special-service cars assigned for loading cinders. Here, again, it is a case of taking the easiest way out, without any thought of the guns, the jeeps, the trailers, the tanks and the multitude of steel shipments that must be made or of the coal to be handled.

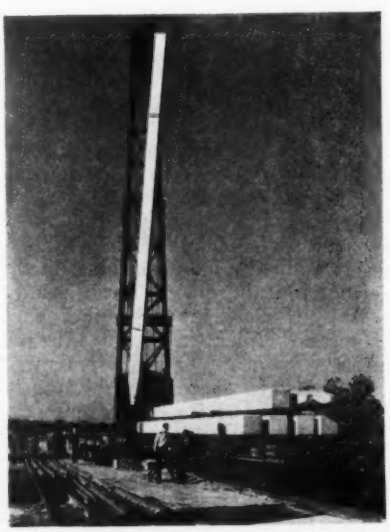
Flat Cars as Well as Hopper Cars Are Much in Demand and Should Be Unloaded as Soon as Possible

Again, it has been observed in numerous instances that automobile cars have been used for shipping spikes, bolts, small pieces of timber, small lengths of rail and other similar items, at a time when plenty of stock cars or box cars suitable for rough loading only were lying idle to no purpose. Every railway in the United States has issued instructions repeatedly that serviceable hoppers, gondolas, automobile cars, flat cars and A and B classes of box cars must not be used for company material. Yet, these cars continue to be used for this purpose, the only explanation for doing so being that they were convenient. It is difficult for one to imagine a first-class box car, suitable for grain loading, used for a shipment of engine wood that might very well have been loaded into a stock car, a box car marked for rough loading or a company service car.

The Most Flagrant Case

Finally, we come to the most flagrant and least reasonable misuse of cars—the delay in releasing those loaded with company materials. Not infrequently, these shipments arrive billed to an agent or to some one else not connected directly with the use or disposition of the material. Somewhere, there has been a failure to advise the agent of the expected arrival, or even upon the arrival, of the person to whom it should be assigned. In consequence, it lies around three or four days before anyone takes any action. Probably the most fertile source of delays is failure on the part of many to insist upon immediate train or switching service to permit the material to be unloaded at the point where it is to be used.

We understand a refusal to permit a way freight or switching train to be delayed while company material is being unloaded en route, and we appreciate that when a negative answer is given by the operating department, those in the maintenance department who are responsible for the material and the release of the cars accept this refusal at its face value and sometimes do nothing about it. This form of inaction can no longer be defended. The decision should be appealed and taken to the ranking officer who can be reached, if necessary, and the required train or switching service should be insisted on so that the cars will be placed at the unloading platform or hauled to the point where it is to be unloaded. This probably will require persistence, but today, no officer from foreman up should rest until the car is released.



Bridge and Building Men, Too, Can Help by Unloading Company Material Quickly

We are fully aware that dispatchers are often harassed because way-freight and switching runs are making overtime. On the other hand, the release of cars from company service is now just as important as keeping down overtime, and the overtime excuse should not be accepted in this instance.

Short Many Cars

The reasons for these injunctions and the seriousness of the situation can be realized when it is considered that during the first two months of 1942 the railways placed 17,000 new cars in service, while, in contrast, in the corresponding months of this year, they were able to place only 3,300 new cars in service. Furthermore, at the end of February, 1942, there were 70,000 cars on order, but at the end of February, 1943, the cars on order numbered only 17,000.

To meet their requirements for 1943, the railways of the United States estimated that they would need 80,000 cars, but the War Production Board, taking into account the material that would be required during the year by the army, navy and air forces, found it expedient to allocate only enough materials to build 20,000 cars. It will be observed, therefore, that we must handle a constantly increasing traffic with 75 per cent less new equipment than our careful planning indicates will be required.

This same ratio holds true for locomotives also, and again it will be seen that we must conserve every locomotive and car to the maximum extent possible if we are to continue to carry on until the war is won. During normal times we retire as obsolete or worn out, from 10,000 to 20,000 cars annually, but during 1942 practically no cars were retired, but all of them have been kept in service and have been kept repaired, to insure that the railways will not fail in the important task allotted to them of providing the transportation needed so urgently to forward our war effort. Knowing these facts, you should need no urging to make the utmost effort to conserve the use of both locomotives and cars, and thus to release loads immediately upon receipt.

Dismantling of These Old Bridges Released 900 Tons of Scrap

After the Floor System of Bridge 641 Was Blocked Up, Cuts (Shown in this View) Were Made in the Floor Plates To Separate Them from the Superstructure and To Facilitate Their Removal

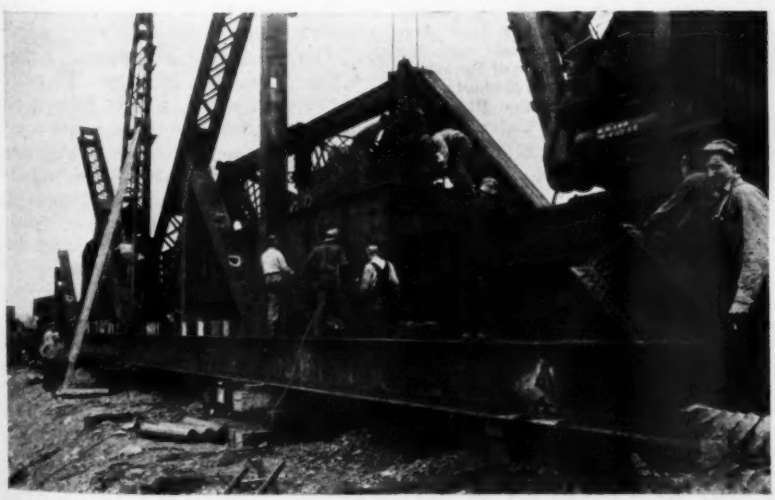
Materials for Victory

No. 10 of a Series

This article tells how the New York Central dismantled two single-span through-truss bridges across the dry bed of the old Erie canal near Clyde, N. Y., making approximately 900 tons of heavy scrap available for the war effort. The spans were replaced with embankments and the work done under traffic in an efficient, economical manner

APPROXIMATELY 900 tons of heavy scrap metal were made available for the nation's wartime industries by the substitution by the New York Central of earth embankments, for two single-span through-truss bridges that crossed the dry channel of the old Erie canal near Clyde, N.Y. Aside from the fact that a substantial contribution to the war effort was involved, the removal of these bridges is of interest because of the rapid and economical manner in which the work was done with minimum interference with railroad traffic.

Of the two bridges involved in this undertaking, one was a four-track structure carrying the New York Central's main line between New York and Chicago, while the other was a double-track span of the West Shore, an affiliate of the New York Central. Both bridges span the channel of the old Erie canal at a point near Clyde, where the two railroad lines are about 800 ft. apart. For many years this section of the canal has been a dry channel, having been abandoned when the New York State Barge canal was constructed.



Removing the Southerly Truss at Bridge 641. Note blocking on New Fill Under Panel Points of Lower Chord and Under Floor System

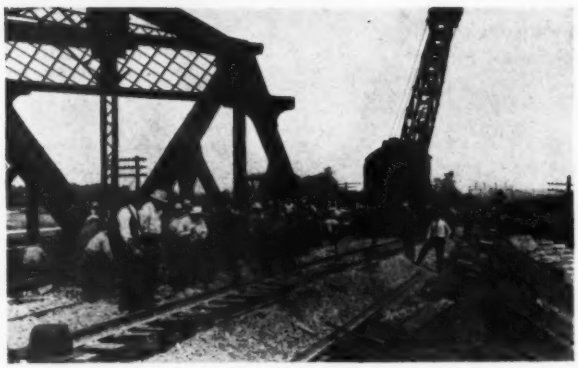
Reasons for Removal

Following the abandonment of the canal, the two bridges could have been replaced with earth embankments at any time, but this had not been done heretofore because it had not been justified economically. The war emergency, however, brought with it a new set of circumstances. In the first place, the railroad recognized that there was an urgent need for scrap metal, and that the dismantling of these two structures would release a substantial tonnage. Also, in view of the greater ages of the bridges and the higher price of scrap, it was easier to justify the retirement of the structures on economic grounds. Moreover, recent experience on the railroad had demonstrated that such bridges could be removed and filled at a much lower cost than had previously been thought possible. Giving consideration to all these factors, it was decided to dismantle and remove both of the bridges and to re-

place them with earth embankments.

Since the two bridges were of similar construction and were removed by essentially similar procedures, this article will be confined to a description of the methods employed in dismantling the four-track structure which was known as Bridge 641. This structure, which produced about 500 tons of scrap, had a length of about 116 ft. and was arranged on a skew layout. The superstructure consisted of three riveted through trusses with a ballasted-deck trough-type floor, which was framed into the lower chords of the trusses. At its maximum, the depth of the channel under the bridge was about 23 ft. Proceeding across the bridge from the south side, the tracks consisted of the eastbound passenger track (No. 2), the westbound passenger track (No. 1), the westbound freight track (No. 3), and the eastbound freight track (No. 4).

Dumping Cinders To Build Up the Southerly Shoulder After the Truss Had Been Removed. Note Middle Truss Still in Place in Background



Removing the Stringer Rails From Under Track 2 After Ballast Had Been Dumped

In this View, Tracks 1 and 2 Are on the New Embankment and the Work of Removing the Northerly Half of the Bridge Is Under Way

Earth Embankment Placed

As the first step in the work of dismantling this bridge, an earth embankment was placed under the structure to a level three feet below the underside of the floor system. This part of the work was performed by a contractor and involved the placing of about 8,000 cu. yd. of material. Obtained from a borrow pit nearby, the fill material was hauled to the site of the bridge in dump trucks and was handled into position with bulldozers, the use of which made it possible to build up the embankment to the desired level in spite of the limited under-clearance.

In dismantling the superstructure, the southerly truss, with the top lateral system between it and the middle truss, and the floor system under tracks 1 and 2, were removed first. Preparatory to this work, the floor system of the bridge was blocked up on the embankment by means of a system of wood blocking under each track. As the foundation for the blocking, a mat of second-hand ties, placed longitudinally with the bridge and loosely spaced, was laid on the fill under each track. At intervals of about 5 ft., two 12-in. by 12-in. timbers, placed one on the other, were laid transversely on the mat of ties, and on top of these a line of stringers, consisting usually of two 12-in. by 12-in. timbers, laid side by side, was placed under the location of each track rail. Timber wedges were driven as necessary to transfer the load to the blocking. Blocking was also placed under the lower chord of the southerly truss at each panel point.

Floor System Cut Free

With the blocking in place, it was possible to proceed with the work of removing the southerly truss and the top lateral system between it and the center truss. As a further preliminary step to this work, the floor system of the southerly half of the bridge was severed, by means of cutting torches, along three longitudinal lines, one adjacent to the lower chord of the south truss, one between tracks 1 and 2, and one adjacent to the lower chord of the center truss. In addition, to facilitate the later removal of the floor system, it was cut transversely into sections consisting of two full troughs, these transverse cuts being made along the center lines of alternate top plates.

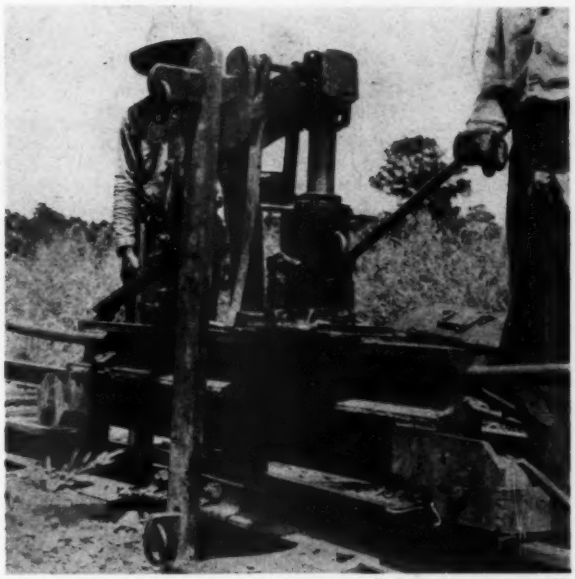
The work of cutting up the floor system in the manner described above was done in part before the dismantling of the trusses and overhead bracing started and was continued while the latter work was in progress. To permit the floor cuts to be made, it was necessary to clear away some of the ballast, and this was facilitated by shoveling it through holes burned at convenient intervals in the floor plates. Where ballast was removed from the troughs at the ends of the ties, timber blocks were inserted in the troughs to hold the remaining ballast in position under the ties.

Up to this point, all work that had been performed at the bridge was done without the benefit of slow or-

(Continued on page 593)

Southern Pacific Cold-Straightens the Droop Out of Rail Ends

This article describes the method and equipment being employed on the Texas and Louisiana lines of this road to bring sagging rail ends back to a true level, straightening bent joint bars at the same time, preliminary to any attempt to correct batter conditions by welding. Based upon several years' pracice covering more than 60 track miles of joints, the method is considered practicable and safe, while effecting large savings in the materials that would otherwise be required to bring about comparable improvement



Close-Up of the Joint-Straightening Machine in Operation. Note the Upward Bend in the Rail

ALONG with the use of all of the commonly accepted and widely used methods of reconditioning rail ends to prolong the life of its rail, including the reconditioning of joints and the building up of rail ends by welding, the Southern Pacific lines in Texas and Louisiana are making effective use of two home-made machines for the cold-straightening of bent or drooped rail ends, thereby overcoming bad surface conditions which, if not corrected, would soon require the replacement of the rail, not to mention the necessity for abnormal maintenance in the meantime. During the last three years, by this method, they have restored to good surface more than 60 track miles of rail that otherwise, under existing traffic conditions, could not possibly have continued in service for long.

Straightens Bars

The problem that has confronted the railroad in this regard has been confined largely to certain of its lines laid with rail of 90-lb. section. With its heavier rail, it has had the usual problems of battered ends and worn or bent bars, which have been corrected by welding and grinding, combined with joint-bar reconditioning of one type or another, but drooping of the ends of this heavier rail has been an exception.

In certain territories laid with the lighter rail, and especially in areas of soft roadbed, the problem, as disclosed readily by a six-foot straight edge, has been distinctly not one of batter alone, or in combination with bent bars, but rather one of drooped rail ends, with vertical bends in the rail usually occurring from 25 to 30 in. from the end, causing a sag at the joints which is beyond the realm of repair by welding and uncorrectable alone by the reconditioning of the joint bars. Often, the drooped condition of the rail ends has been accompanied by bent bars and battered rail ends. However, the principal problem has been the bend in the rail, which led to the development of the machines, which not only straighten the rail, but the bars as well. This is followed by the solid tamping of the joint ties and the welding up of any rail-end batter that may be necessary. While not entirely new, as machines operating on the same general principle have been employed on the Missouri-Kansas-Texas and on certain other roads in the past, the Southern Pacific machines, mounted on the rail, merely cold bend the rail ends upward to the point where, when the force is released, they are in true surface.

As shown in the accompanying illustrations, each of the machines includes essentially a rigid frame or jacking beam, mounted on double-flanged wheels at the ends, which spans the sagged rail ends at a joint; a fulcrum beam, mounted longitudinally over the jacking beam, with a sturdy fulcrum post at one end and a hydraulic jack at the other; and a link and pin arrangement of heavy bars connecting the underside of the base of the rail at the joint with the top of the fulcrum bar, whereby the rail is raised between the points of downward reaction of the machine as the fulcrum bar is raised by the operation of the jack.

The frame, or jacking beam, consists of two lengths of 130-lb. rail placed base-to-base in a vertical position and fillet-welded together along the edges of the base flanges to form a monolithic member. This frame is equipped with a pair of wheel-mounting brackets at each end, fabricated from scrap three-quarter-inch steel

plate, each pair of brackets housing a six-inch double-flanged dolley-type wheel, secured from old dismantled tie-tamping equipment. The carriage wheels are seven feet center-to-center, and their mounting is such that the underside of the frame is about 1¾ in. above the top of the track rail.

The fulcrum beam is a section of an old locomotive side rod, about 3½ in. by 5 in., by 36 in. long, pivoted at one end to the upper end of a fulcrum post made of double-strength steel tubing, with a 3-in. outside diameter. The opposite, or jacking, end of the beam is supported, and is raised and lowered by a 30-ton, two-speed, hand-operated hydraulic jack, the high-speed mechanism being used to take up the slack in adjusting the machine for the straightening operations, and the low-speed mechanism for applying the straightening pressure. This jack, which rests on an ½-in. steel plate, welded on top of and suitably braced against the top rail of the main frame, has a pivoted connection with the free end of the fulcrum beam, and is of adequate capacity to straighten any rail weighing up to 90 lb.

Another View of the Joint-Straightening Machine — From the Gage Side

Heavy Straps Do Lifting

The link and pin arrangement for transferring the jacking pressure from the fulcrum beam to the track rails consists of two vertical straps or lifting bars, each 5 in. wide, 1½ in. thick and 48 in. long, cut from old bridge eye-bars, and two shorter bars of about the same cross section, to tie the two lifting bars together above the fulcrum beam and below the base of the track rails. The shorter bars, or pins, are merely slipped into position through slots provided in the lifting bars, above the fulcrum beam, and below the track rails, and each is equipped with a steel hand ring whereby it can be readily removed—the bottom bar when moving the machine from joint to joint, and the top bar when the occasion arises for dismantling the machine for any reason. In connection with these lifting bars, it is of interest to note that it was found necessary to harden all contact surfaces to prevent their crushing under repeated loads. It was also necessary to heat-treat the heavy fulcrum beam to increase its stiffness.

To hold the machine in a vertical position on the rail, it is equipped with an outrigger arm extending to a roller on the opposite rail. This arm is readily removable, a feature desirable in the removal of the machine from the track to clear for traffic.

In the operation of cold bending the rail with the machine, the upper pressure of the jack is converted through the fulcrum beam and link and pin arrangement to an upward pressure on the base of the track rail directly at the joint, raising the rail sufficiently high to bend it back to a true surface through the joint area. To take the load off the carriage wheels during this operation, and, of greater importance, to place the downward reactions of the machine on the track rails at the specific points of bend in these rails either side of the joint, steel reaction blocks are placed between the underside of the machine frame and the heads of the track rails. These blocks, each 2 in. by 2 in. by 3 in. long, with a handle on one end, are merely inserted between the rail and the frame at the points desired, by lifting the machine, one end at a time, about ⅜ in. to ½ in. To simplify the lifting, each end of the machine is equipped with an extension lifting bar, as shown in the accompanying illustrations.

Sequence of Operations

In the use of the machine, the first step is to see that the joint bolts are tight, a precaution that is usually taken care of several days in advance of the straightening work, but which is checked just before straightening operations begin. Then, using a six foot straight edge, the exact points of bend in the rails are determined and marked, indicating for the machine operators the exact locations for the reaction blocks. Following this, employing a tie puller, the tie or ties immediately beneath the rail joint are slipped laterally off the track a sufficient distance to provide working space beneath the joint to house the lower end of the lifting arrangement.

Rolled forward from the previous joint treated, with the lower ends of the lifting bars trailing loosely over the ties, the machine is spotted over the joint to be raised, with the lifting bars hanging vertically opposite the center of the joint. While in this position, the lower bar of the lifting arrangement is slid laterally into place and the two reaction blocks are placed on the rails beneath the frame, at the points of bend in the rails, marked previously.

With these preliminaries out of the way, slack in the lifting arrangement is first taken out by operating the high-speed mechanism of the jack, following which, employing the low-speed mechanism, the rail ends are drawn upward to take out their droop. In this latter operation, experience has shown that to bring about a true level in the rail, the upward lift at the center of the joint must be approximately three times the former permanent set downward—that is, the lift required above the final level sought must be twice the original droop.

To guard against excessive bending, an adjustable gage, or spot, block is placed on the rail head, centered over the joint, which, set to allow the height of raise desired, contacts the underside of the machine frame when that raise has been effected. The adjustable feature of this block, which is of metal, 1 in. by 1¼ in. in section, and 1½ in. long, is a set screw on its top side, which can be run in or out, as desired, to determine its gaging height.

When the upward bend at a joint has been completed, straightening both of the rail ends and removing any bend in the joint bars, the jack is slackened off, the bottom lift bar is pulled out, the reaction blocks are removed, and the machine is rolled ahead free of the joint. Immediately following this, the joint tie or ties are forced back to their original position with the tie puller, and are tamped up solidly against the rail, completing the process at that joint.

No Damage to Rails

All of the work of cold bending rails in track on the lines of the Southern Pacific in Texas and Louisiana has been on rail of 90-lb. section or light-

(Continued on page 593)

Creates Reservoir by Adding Spillway to Culvert

WHEN the output from a deep well proved inadequate to supply the water requirements of a new engine terminal that it was building at Cowen, W. Va., the Baltimore & Ohio solved the problem by creating a reservoir in a local creek, using a new railroad embankment as the impounding dam and building a suitable spillway at the upstream end of a culvert through the fill. By this means a supply of water was obtained sufficient to satisfy the locomotive boiler requirements at the terminal, and the output of the deep well is used only for sanitary and drinking purposes in the new enginehouse.

The construction of the terminal involved the building of a wye-track layout, two legs of which come together to form a tail track. In the vicinity of this junction the tracks are carried across a small stream, known as Big Ditch Run, on an embankment about 18 ft. high. A culvert consisting of two circular concrete pipes, 60 in. in diameter and 188 ft. long, carries the stream through the fill. In preparing the site of the terminal considerable excavating work, mostly in solid rock, was involved, and the embankment is composed largely of this material.

Originally it was the intention to supply the total water requirements of the new terminal from a deep well, but the output from a test well proved disappointing and it was necessary to consider other possible sources. One of these was Big Ditch Run, and an investigation revealed that if its flow could be impounded, a supply sufficient to meet the needs for locomotive boiler water at the terminal would be provided by the reservoir.

Embankment Provides Dam

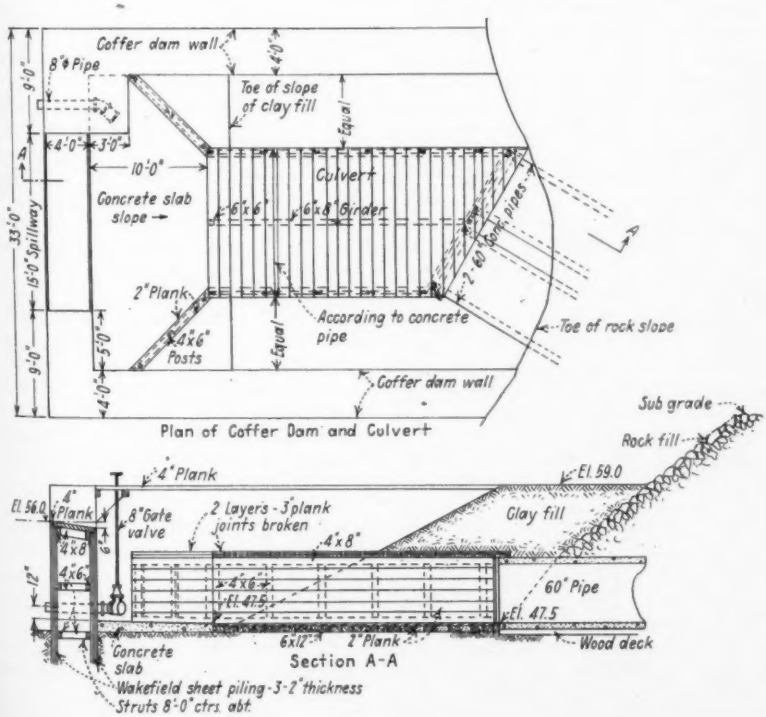
Since a dam was already available in the form of the railroad embankment, and topographical and other local conditions were conducive to the formation of a reservoir, it was only necessary to provide a means of controlling the water level and to take measures to render the rock fill impervious. This latter objective was accomplished by building a supplementary clay fill or berm against the upstream slope of the embankment. This berm extends to a height of 11.5 ft. above the flow line of the culvert and has a width of about 12 ft. at the top.

Because of the addition of the clay berm, it was necessary to build an extension to the upstream end of the culvert, this extension consisting of a timber box, rectangular in cross-section, which was built of such dimensions as to encompass the ends of the two pipes. The box has double side walls of 2-in. planks nailed to 4-in. by 6-in. posts, a floor of 2-in. planks nailed to a mat of 6-in. by 12-in. timbers, placed transversely, and a roof consisting of two layers of 3-in. planks with staggered joints, the latter being supported along the center line by a longitudinal 6-in. by 8-in. girder on 6-in. by 6-in. posts. The culvert is placed on a moderate skew with respect to the embankment, but the extension was built substantially at right angles to the latter, thereby introducing an angle at the junction of the culvert and the extension.

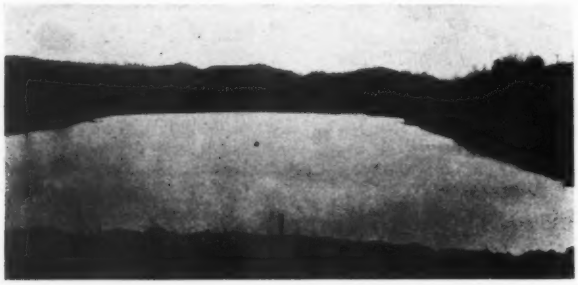
Cofferdam and Spillway

To control the water level in the reservoir, a cofferdam was built around the upstream end of the extended culvert with a spillway in its end wall. The cofferdam is a three-walled structure with the inner ends of the side walls anchored in the clay berm. The tops of the walls are even with the top of the clay berm and the level of the spillway is 3 ft. lower. Thus, it is 8.5 ft. above the culvert flow line. Each wall of the cofferdam embodies two lines of Wakefield timber sheet piling (each line consisting of three 2-in. thicknesses), which are driven 3 ft. apart with the space between filled with clay. The top of each wall is covered with 4-in. planks. The over-all width of the cofferdam is 33 ft. and the length of the spillway in the end wall is 15 ft.

For anchorage purposes, the mat of 6-in. by 12-in. timbers under the culvert extension was made to extend the full width of the cofferdam and is fastened to the side walls. Timber wingwalls at the outer end of the culvert extension tie into the side walls of the cofferdam. Between the end of the extension and the end wall of the cofferdam, the distance is 10 ft., and in this area the floor of the cofferdam is protected with a concrete apron. Aside from the spillway, an additional measure of control over the water level is provided in the form of an 8-in. pipe through the end wall of the cofferdam near the bottom of the reservoir, which is fitted with a gate valve that may be operated by a hand wheel conveniently placed at the top of the cofferdam.



Showing Details of the Culvert Extension and the Cofferdam With Spillway



The Reservoir at Cowen Showing the Spillway in the Right Background

For softening the water from the reservoir, a soda ash treating plant was constructed nearby, which, in addition to a small frame treating house over a concrete pump pit, embodies a second-hand steel storage and treating tank that was moved to this site from a location where no longer needed.

What Our Readers Think

Boy Employees In Track Work

Minneapolis, Minn.

To the Editor:

Having had a part in the program described in the article entitled High School Boys Fill Track Men's Shoes on the Milwaukee, which appeared in the July issue of *Railway Engineering and Maintenance,* it occurs to me that it might be of interest to the officers of other railroads to know something about the methods that are being employed in training these young men in safety matters.

That the safety and welfare of these high school boys, 16 and 17 years old, would need special consideration, was fully appreciated by L. J. Benson, assistant to the chief operating officer on the Milwaukee, who has charge of all safety activities, and he instructed the district safety engineers on his staff accordingly. Since a large number of the boys assigned to work on regular sections and in extra gangs were in my territory, the subject of their safety training was discussed at once with the division officers and a program was mapped out which, to date, has produced good results.

Realizing that teen-age boys, without previous track experience, could not be handled in the same manner as seasoned trackmen, an effort was made by the district safety engineer to contact them before they actually started work, in an endeavor to impress upon their minds the need for working safely, and that safety would have to be of the first importance. This was done with the boys individually and in groups, and where high school coaches were employed as monitors to supervise the off-duty conduct of the young men and to build up the necessary morale, as pointed out in your article, special attention was given to post them on the part they were to play in the safety program.

Consideration was given to the fact that most high school boys are full of energy and vitality, and that without proper direction these qualities can result in the development of careless practices. For this reason, all of the boys were instructed specifically as to the correct and safe procedure to follow in every phase of their work.

Picking foremen with special qualifications for handling these boys in a way to accomplish best results with safety is of primary importance, since these results can be accomplished only by proper and adequate supervision. The foreman must be able to assign the boys to the various tasks at hand according to their physical and mental ability, and must organize his forces to prevent injuries that might result from overstraining or fatigue. To this latter end, he must arrange for the boys to relieve each other periodically when working with electric tie tampers or other power tools. This practice does not slow up the work where the foreman plans his work beforehand with the thought of thus utilizing the "boy-power" available, and it adds greatly to the safety with which the work will be done. It is essential that over-fatigue be guarded against because a tired boy will sit near the end of a nipping bar after having raised the tie for a spiker, placing himself in danger of injury if the bar should slip from beneath the tie. Likewise, a tired boy will leave a jack handle in the jack rather than exert the effort to remove it, thus subjecting himself to the possibility of serious injury in the event the jack slips.

The alert foreman appreciates fully the need for constant attention to unsafe practices and the importance of correcting them immediately, whether they are the result of fatigue or carelessness. To assist the foreman, the division engineer, roadmaster, track supervisor and representative of the safety department should take a sincere interest in the safety and welfare of the boys. They should visit the gangs as often as possible for the express purpose of discussing the subject of accident prevention with the boys and with those in direct charge of them.

That the track is no place for play while either on or off duty should be stressed particularly with boy employees, and that they should not walk or step on the rails or run on the roadbed should be brought to their attention as specific means of preventing accidents.

Realizing that dissatisfied boys become shiftless and careless, it is highly important to maintain good morale among them. The local athletic coaches or other school representatives employed by the Milwaukee to work with the boys serve a very definite purpose in this respect. These school representatives also provide the necessary atmosphere to encourage the boys to study the safety rule books provided them by the railroad.

Where it is necessary to house the boys in camps, as is being done on the Milwaukee, it is essential that the camps be exclusively for the boys, and that the athletic coaches become a part of the group. One of the specific advantages in such an arrangement is that the camp coach can supervise the off-duty activity of the boys to the extent that they will not engage in too strenuous play for too long a period, which would make them prone to accidents when back on the job.

On the Milwaukee, where approximately 1300 boys are now engaged in track work, we are taking these precautions. That our efforts have not been in vain is revealed by the safety record, which shows that during the months of May, June and July of this year, none of the boys incurred a reportable injury.

M. L. Medinger,
District Safety Engineer,
C. M. St. P. & P.

S. P. Cold-Straightens Rail Ends

(Continued from page 590)

er, fitted with 24-in., 4-hole, 100-per cent joint bars, primarily because the problem of drooped rail ends has occurred only in connection with these lighter sections. There appears to be no reason why the same method of straightening cannot be used in connection with rails of heavier section if the need should arise, but the experience on the Southern Pacific indicates that a machine of still more sturdy design than that described, including a more powerful jack, would be required to carry it out.

In the operations discussed in this article, which have been carried out on high-speed as well as on low-speed tracks, some bars have been broken during the straightening process, but in each case, observation has shown that the bars broken were cracked prior to the straightening work. That these cracked bars were discovered in the straightening process is considered fortunate rather than the basis of any criticism of the process itself. In no case has the method been observed to crack otherwise sound bars, and in no cases have bars or rails broken subsequently under traffic.

The force involved in the rail straightening work includes a total of 12 men, who are normally engaged at three joints at a time. Of the total force, two men are usually engaged in checking the tightness of the bolts and sliding the joint ties from beneath the joints to be raised, operating at the joint immediately ahead of that occupied by the machine; three men and a foreman measure the joint sag and operate the bending machine; while the remainder of the force follows immediately behind the machine, replacing the ties and tamping these as well as all other loose ties within the joint area. All work is continuous on one rail at a time.

60 to 80 Joints a Day

The actual machine operation in the straightening work requires only 60 to 80 seconds, but, on the basis of the production to date, which has averaged from 60 to 80 joints in an 8-hour day, it is evident that the overall time required for correcting the condition at each joint amounts to somewhere between six and eight minutes.

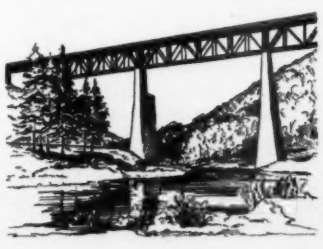
Many of the rail ends straightened by the method described are battered at their extreme ends and require building up by welding, a practice which is followed wherever necessary. At the same time, through the preliminary cold straightening of the rails and joint bars, the minimum amount of welding is required to correct batter conditions. In fact, it is estimated that the use of the cold straightening process reduces by one-third the amount of weld metal and gases that would otherwise be required to correct batter condition. It obviously also overcomes the use of materials or gases in overcoming the bent condition of the joint bars themselves.

In single-track territory, where most of the rail straightening work has been done, removal of the machine from the track to clear for traffic offers no special problem. To do this, the jack is first removed, following which the outrigger arm is disconnected. Then, with two lining bars inserted in the sockets freed by the two legs of the outrigger arm, and used as lever arms, the machine is tilted sidewise until it is flat or inclined downward on the ballast shoulder. In this position, other lining bars are used to pinch it a safe distance away from the running rail. In replacing the machine on the rail following an interruption to the work, the process of removal from the track is merely reversed.

Dismantling Bridges Released 900 Tons of Scrap

(Continued from page 588)

ders or without otherwise interfering with traffic. The forces were now ready to remove the southerly truss and the top lateral system between it and the middle truss, and on the day on which this work was undertaken, a 10-mile-an-hour slow order was placed in effect on tracks 1 and 2, although at various times while this slow order was in effect the full use of one or the other of these tracks was obtained for short periods. Removal of the superstructure was started simultaneously at both ends of the bridge, using two cranes for handling the severed members, and while this work was under way, the forces doing it had the use of track 2. Using oxy-acetylene torches, the members were burned loose at convenient points and loaded into a car spotted between the cranes. With the cranes working toward each other, the top lateral system and the upper chord of the truss were dismantled first, after which the verticals and diagonals were removed. Finally, the lower chord of the southerly truss was also cut into sections and loaded. When this had been done, the southerly shoulder of the embankment was built up with cinders placed by side-dump cars.



Floor Troughs Removed

In the next step, which was begun at one end of the bridge and carried progressively toward the other, the rails and ties of track 2, and the floor troughs under it, were removed, as were the 12-in. by 12-in. stringers that had supported the floor system under this track. In place of these, a stringer rail, blocked up as necessary, was installed under the location of each track rail, and the permanent track was then built in place on this temporary support. Ballast was then placed by pushing loaded ballast cars out onto the track and dumping them. When this had been done the stringer rails were salvaged by withdrawing them from under the track with one of the cranes; also, as much as possible of the blocking under these rails was reclaimed. When track 2 had been installed on a permanent basis, the slow order on this track was raised to 30 m.p.h., after which the procedure followed in removing the floor system under track 2 was repeated for track 1.

Following the procedure described above, all the work involved in dismantling the southerly truss and its top lateral system and of removing the floor troughs under tracks 1 and 2 was carried out in three days. The next step was to remove the northerly portion of the bridge, which was done in essentially the same manner as described above for the southerly half, except that this last phase of the work also entailed the removal of the middle truss.

Except for the grading, all the work involved in removing this bridge was performed by the bridge and building forces of the Syracuse division. The project was handled under the general direction of G. N. Edmondson, engineer maintenance of way of the Lines East of Buffalo, and A. W. Carpenter, engineer of bridges, who retired on March 1 of this year. P. H. Winchester, division engineer, was in direct charge of the undertaking, while the procedure followed was developed and planned by the late E. L. Jenkins, supervisor of bridges and buildings.

What's the ANSWER?

Building Up Switch Points

Is it practical to build up or recondition switch points by welding? If so, should they again be used in main tracks? Why? What precautions should be observed?

Practical and Economical

By W. H. VANCE
Assistant Engineer Maintenance of Way, Missouri Pacific, St. Louis, Mo.

It is not only practical but it is also economical to build up or recondition switch points by welding. Furthermore, critical war materials are saved by doing so. Reconditioned or built-up switch points should not be used in main tracks carrying high-speed or dense traffic, owing to the possibility of unrelieved stresses being set up in the metal during the process of welding, but they can be used safely in main tracks carrying light traffic and in low-speed branch lines. The day is probably not far distant when welding will be developed so highly that there will be no hesitation about the use of reconditioned switch points in any track.

It is imperative that the reconditioned point fit the stock rail, and when work is done in the field, the point is usually built up to fit the stock rail. When the point is reconditioned at a central shop, however, it is usually necessary to change the stock rail, or fit the point to it by grinding.

Must Be Done

By G. S. CRITES
Division Engineer, Baltimore & Ohio, Baltimore, Md.

This is one of the things that must be done at this time to conserve critical materials, and that should be done at all times to insure economical use of materials. Switch points are made from standard rails, usually from the same rolling as those in the track. They may or may not have tips of alloy steel, and they may or may not be heat treated, depending on the service to which they are to be subjected. Such points can be built up safely and satisfactorily by appropriate welding technic. The fact that poor fitting or worn switch points are a menace to the safe operation of trains makes it imperative that the points always be as good as it is possible to make them. This precludes wearing them out where they are installed originally. Modern methods of welding and repair can make a point that is worn, but still in condition to function safely in the track, as good as new, if not better, since the worn point has been cold rolled and stressed sufficiently to develop any defects which it may have possessed.

Reconditioning a switch point is as much a shop job as repairing shoes is a shop, instead of a cobbler's, job. Worn points should not be "cobbled," but shopped for reconditioning by welding, so that they may get uniform treatment and at the same time have the reinforcing, rivets and attachments made as good as new. This applies particularly where a number of points are to be reconditioned.

Switch points that have been repaired properly can be used safely and economically in all non-interlocked main-track switches, except where the turnout is from the outside of a curve. No lateral thrusts of consequence are met by points installed on tangents, and controlled speed is required for movements through non-interlocked turnouts. Protection of

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered in October

1. In what ways and to what extent can the service life of rail be extended through good maintenance? Who should be responsible?

2. What measures should be taken when installing a wood-block floor, that will prolong its life? Why? How should the joints be treated? Does the service to which it is subjected make any difference?

3. Considering the present density of traffic and speed of trains, to what extent is it desirable to place lookout men to protect track or bridge gangs? Does the character of the work make any difference?

4. Where the track is being given a general raise, should the depth of the ballast be increased across ballast-deck trestles? Why? If not, how can it be avoided? How will train movements be affected?

5. Where tie renewals are less than 100 to the mile, what is a reasonable output per man when renewing ties in main tracks? What effects do the density of traffic and the kind of ballast have?

6. To what extent can the use of critical materials in pipe lines be avoided through the use of substitute materials?

7. In view of the increased supply of locomotive cinders, is there any advantage in placing them on the shoulder of embankments? Any disadvantages? Should the shoulder of the roadbed be lowered before the cinders are placed? Why? How?

8. Is the fireproofing of building lumber practical? What are the advantages? The disadvantages? Will it interfere with the preservative treatment of the lumber? With painting the building?

switch points on the outside of curves has not yet reached the stage where the points can be shielded entirely from thrusts, so that it seems best to replace both worn points and stock rails at such points with new ones instead of making repairs.

It is true that worn switch points that are otherwise in good condition, can be built up safely in place by welding in yards and on main tracks of light traffic, provided the track is taken out of service while the welding is being done and the metal is allowed to cool so that it will not roll out under the wheels. In general, at present, tracks are too busy and delays to trains are too upsetting to permit switches to be taken out of service, even for short periods.

The determination whether running repairs to switches be made by welding in the track or on the ground, or whether all worn points will be scrapped or sent to properly-equipped shops for repairs, warrants an economic study by any railway of any size. In general, however, shopping the worn points will be economical.

Recommends Welding

By Charles Wise
Track Welder, Chicago & North Western, Proviso, Ill.

I consider it entirely practical to recondition switch points by welding. I have been doing this for about 20 years and during this period I have not had any points that might be called failures. However, it is only within the last 10 years that we have felt warranted in welding points for main-track use, but this has been so much of a success that it is now no longer a question whether it can be done. I weld 112-lb., 30-ft. points in main-line high-speed tracks as a matter of routine and with entire success.

Switch points in the main track, that are to be reconditioned in this manner, should be welded before they have become worn too much. The principal precaution is to make sure that the stock rail is in good condition. If there is any overflow of metal, this should be ground away before the weld is started. Then the point should be adjusted so that it fits tightly against the rail. It should then be built up so that it is slightly lower than the running surface of the stock rail. After the weld is completed, the point should be finished off with a grinder, although, if the work has been done carefully and neatly, this is not absolutely necessary.

I also recondition switch points out of the track. These are shipped in from all over the system and go out again to all parts of the system. The principal difficulty we have with the points that are built up out of the track is that the foremen who receive them, seeing that they are old ones, put them in the track against old stock rails which, in most cases, are lower than the points. When this is done, the point will invariably break or chip. The same precautions should be observed with a welded point as with a new one. The stock rail should be in good condition and the point should fit tightly against it.

How to Obtain Water Samples

How should raw-water samples be taken to assure accuracy and uniformity of tests? How should they be taken from locomotive boilers in operation? From stationary boilers?

Flush Sampling Lines

By H. M. Laudemann
Chief Chemist, Chesapeake & Ohio, Huntington, W. Va.

Sample containers must be clean and labeled correctly for identification. They should be rinsed three or more times with the water to be sampled. All sampling lines must be flushed thoroughly before the samples are collected. Feedwater samples should be taken from the discharge line of the feedwater pump after it has been in operation for a sufficient time to insure a uniform mixture. A sample from a stream should be taken at a sufficient distance from the shore to avoid local drainage pollution and insure actual equality. The feedwater sample for a locomotive boiler may be taken from the locomotive tank.

Locomotive boiler-water samples may be collected from the water column, the gage glass, the gage cocks or the blow-off lines. To do this, after the line has been flushed thoroughly, the sampling valve should be opened slightly, to avoid excessive flashing of hot boiler water while drawing the sample. Samples may be drawn from stationary boilers in the same manner, if cooling coils are not provided.

Boilers should be at working pressure when the samples are collected, to insure good circulation of the boiler water. Feedwater pumps or injectors must be closed while the samples are being collected. When internal treatment is used, the correct time to collect a sample is immediately before the boiler is blown down and before the addition of chemicals, if a slug-type treatment is used.

If dissolved-oxygen tests are to be made, all hot-water samples must be drawn through a cooling coil, such as the device described in the eighth edition of Standard Methods of Water Analysis, pages 88-89, published by the American Public Health Association and the American Water Works Association. Also, a special sampling container and a procedure must be followed, similar to the method outlined on page 114.

Run Pump One Hour

By E. M. Grime
Engineer of Water Service, Northern Pacific, St. Paul, Minn.

To obtain a representative sample of raw water, the pump should have been in operation for at least one hour before the sample is taken from the discharge line. In this, as in all other cases, the container to be used for the sample should be clean and should be rinsed out thoroughly with the water being sampled to be sure that it is clean and that it contains no remainder from previous use.

When a sample is to be taken from a locomotive boiler, care must be exercised to insure that it is free from any dilution by reason of condensate resulting from steam entrained in the water as it leaves the boiler. The sample should preferably be taken from the water column or the water glass after the column has been blown out thoroughly and the water stream is free from steam bubbles. To be sure that the sample is representative, the locomotive should be working steam, but the injector should be shut off to make certain that no fresh water is entering the boiler. If it becomes necessary to take the sample while the locomotive is standing in the enginehouse, it should not be taken until several hours after the boiler has been filled. Because of lack of circulation, there is often a wide variation in the quality of the water in samples taken at the blow-off cock and those taken in the house after the fire has been knocked.

If the stationary boiler is of the drum type, the samples should be taken from the top drum or from the water glass after it has been blown

out thoroughly. If the stationary boiler is of the locomotive type, the same precautions should be exercised as for locomotives.

Three Essentials

By C. R. Knowles
Superintendent of Water Service (Retired)
Illinois Central, Chicago

There are three essentials for taking samples of either treated or untreated water for examination. These are (1) the samples must be representative; (2) the container must be clean and free from anything that might contaminate the sample; and (3) the sample must be marked plainly to indicate its source. Extreme care is necessary to insure that the sample represents the average condition of the water, for it is so small a fraction of the total body of water that any small variation from the average will be multiplied many times in the results of the test.

If from a reservoir, the samples should be taken some distance from the shore or wall to avoid shore-line contamination, as well as to avoid shallow water where the quality may be affected by temperatures differing materially from that of the main body. If taken from a stream, it should be collected in the current rather than in still water, for the pools may not be at all representative. If taken from a valve or faucet, the water should be allowed to run until the smaller pipe lines are flushed thoroughly. Samples from lime-soda ash or other external-type treating plants should be taken from the discharge line after the chemical reactions have been completed. When internal treatment is applied direct to water columns, the sample should be taken from the locomotive tender after it is filled. If the chemical is applied in the locomotive tender, it should be mixed thoroughly with the water before the sample is taken.

Samples taken from a locomotive in operation should be drawn from the blow-down line, the gage glass or water column or, in some instances, from the gage or blow-off cocks. In either case, the line should be flushed out before the sample is taken, except when samples of sludge from the blow-off line are desired. Care should be exercised to avoid flashing the water, since this will increase the concentration. A clean rubber hose extending to the bottom of the sampling container will largely avoid flashing. The receptacle should be allowed to overflow until two or three times its volume has been wasted. Boiler samples should be taken immediately before the boiler is blown down, and never while the injector or feedwater pump is in operation.

Scrupulous cleanliness should always be observed in sampling water, if accurate results are to be expected. Sample bottles should be marked plainly to indicate the source of the water, the date taken, the name of the stream or other source of supply; if from a locomotive boiler or tender, the number, the days in service since washing and any other pertinent information should be given.

Critical Materials in Floors

In what ways can the use of critical materials be avoided in the construction of floors? Are there disadvantages?

Very Little Required

By A. T. Hawk
Engineer Architect, Chicago, Rock Island & Pacific, Chicago

To approach this question intelligently, it is well to list the flooring materials in most common use in railway buildings. These include rolled earth; compacted cinders, gravel or crushed stone; wood joists and flooring; concrete base, screeds and flooring; creosoted wood blocks; marble, magnesite, art marble and terrazzo, laid on a concrete base; asphalt, tile, linoleum and composition over wood or concrete; concrete, plain or reinforced; rock-bound, asphaltic or bituminous concrete; asphalt applied hot over concrete; asphalt applied cold over concrete; paving brick over a concrete base.

It will be noted that metal flooring is not included. Frequently, steel floor joists are used with concrete floors or sub-floors, as are precast concrete joists. Cellular steel is very effective as flooring in some types of buildings, but this is also in the critical list.

As I view the matter, concrete offers the most satisfactory floor, and uses very little critical material. If the floor is laid close to the ground line, and the base is compacted thoroughly and uniformly, reinforcement may be omitted, except for a few rods at expansion joints. Sufficient rods for this use can generally be obtained from second-hand and reclaimed stocks.

If the floor is to be at car-door height, a comparatively thin side or retaining wall, slightly reinforced, with the vertical reinforcement tied back into the floor slab, will make an ideal design. Before the slab is placed, the space back of the retaining wall should be filled with sand or other stable and easily compacted material, and the floor slab should be constructed of relatively dry concrete, well rammed. This slab should be reinforced with light wire mesh for tension. The concrete should be as dry as it is practicable to use, and after it is rammed there should be no skimping of hand or machine troweling.

If properly laid on an adequate concrete base and if crowned to shed water, a good quality of paving brick provides a lasting floor for enginehouse. However, a concrete floor of adequate thickness on a well-rammed and stable fill, will be better and can generally be constructed at less cost. If of good quality and correctly laid on a concrete base, treated wood blocks or asphalt blocks are excellent materials for shop floors. However, in shops of less importance, concrete floors without reinforcement give very satisfactory results, and at a greatly reduced cost.

While lumber may not be classed as critical, it is extremely difficult to obtain, especially that which is well seasoned or treated preservatively. Stress grades are still critical. Steel grating has been used normally for surfaces over which heavy trucking is done, but this cannot be obtained at present, owing to the urgent demand for it for use in runways in air fields all over the globe.

Finds No Disadvantage

By L. G. Byrd
Supervisior of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

Some grades and sizes of lumber and timber are now classed as critical, and the remainder is so hard to obtain that it might as well be. This is particularly true of the dimensions used for floors, whether they be in shops, enginehouses, freight houses, offices or stations. In shops, where the traffic over the floors is heavy, as where lumber carriers are operated, timber flooring receives severe punishment. For this reason, we are eliminating wood floors and are replacing them with plain concrete, which has a much longer service life.

Where the flooring in office buildings is badly worn and is rough and uneven, we are now covering them with asphalt tile, which has a much neater appearance, is resilient and sanitary, and gives better traction. We have found no disadvantages in either of the floors mentioned; they are not critical materials; maintenance is substantially eliminated, provided they are installed with the care that all such construction should receive.

Adapting Old Bridge Steel

What considerations are involved in the adaptation of second-hand structural steel for use in existing bridges?

Normally, It Is Economy

By G. A. Haggander
Assistant Chief Engineer, Chicago, Burlington & Quincy, Chicago

Normally, the main consideration in adapting second-hand structural steel for use in existing bridges is that of economy. It has been our practice to remove steel structures on our heavier-traffic main lines, where a still further increase in motive power was contemplated, and to re-erect them on a secondary lines, where their load-sustaining capacity was ample for all requirements of those lines. Obviously, this avoided the purchase of new spans for these secondary lines. We also have other cases where spans of heavy load-carrying capacity are removed from lines that are being abandoned, or for other reasons, and we prefer to use these in preference to purchasing new steel. At present, however, we have the added problem of the limited availability of new structural steel to contend with. In consequence, we are now doing a considerable amount of work in the way of reinforcing available second-hand spans in place of attempting to purchase new spans.

Care Must Be Exercised

By General Inspector of Bridges

Several important considerations must never be lost sight of when reusing structural steel for the repair of existing bridges. Plates, angles, channels and other shapes from very old structures may be of wrought iron instead of steel, in which event the technic of their reuse will differ somewhat from that for steel, with respect to both design and field work, and this should be checked carefully.

Almost invariably, the second-hand structural materials that are available for strengthening or repairing existing structures come from the older and lighter structures that have been dismantled because they were too light for the loads they were carrying; because they were damaged by flood or wreck; or because the line upon which they were serving has been abandoned. In any event, many of these older structures have been taken out of primary use and re-erected on lines of lighter traffic where they have served for many years, and where they have seldom been maintained as well as those on important main lines. Not a few of them show evidence of damage sustained during the process of dismantling and re-erection and, while they have been maintained in safe condition, many of the component parts require the closest scrutiny before being passed as suitable for use in a modern bridge, whether they are to be added for strengthening or used in replacement.

No second-hand material should ever be employed in replacement, or for strengthening a member, without the approval of the engineer of bridges or of some member of his designing staff. The man in the field does not have information at his disposal concerning the existing structure sufficient to enable him to know whether any plate or shape will be suitable for the purpose for which he wishes to use it. Likewise, he should never attempt to apply a piece of either new or second-hand structural material, by either riveting or welding, without an approved plan, for he is in no position to know what is required in either respect.

Many old structures are exceedingly light and some of them have been stressed beyond the point of good judgment by overloading. As a result, plates and angles are sometimes cracked, generally through the rivet holes. For this reason, every piece that is sorted out as fit for further use should be inspected with exceptional care before it is passed. Generally, this should be done while the members are being cut apart. Smaller cracks sometimes occur also, and these should be indicated as well as the larger ones.

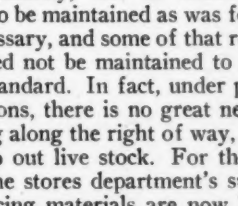
Maintaining Fences

What measures can be taken to keep right-of-way fences in good condition, in view of the present shortages in labor and materials?

Supplies Exhausted

By Maro Johnson
Principal Assistant Engineer, Illinois Central Chicago

Fortunately, not as much fence needs to be maintained as was formerly necessary, and some of that remaining need not be maintained to a very high standard. In fact, under present conditions, there is no great need for fencing along the right of way, except to keep out live stock. For the most part, the stores department's supplies of fencing materials are now largely exhausted. Occasionally, however, a country dealer may be found who has a small quantity of farm-grade fencing on hand; otherwise, second-hand materials must be depended on. Sometimes, in the case of woven wire, it is necessary to put two layers of this material on the posts to turn small stock.



Released track ties frequently have been used for posts, but no ties with remaining track life should be used for this purpose. The construction of highways adjacent to the railways and, more recently, the abandonment of branch lines, has made much second-hand fence wire available for reuse. Wire may also be taken from fences that are not essential at the moment and transferred to points where fences are a necessity, or part of the wire may be removed from fences where full maintenance is not required. Wood fences, using sturdy saplings for rails, may be built to confine or turn cattle and horses. Farmers understand the present situation

and, in general, are quite co-operative, frequently furnishing the labor to apply the material turned over to them by the railway.

Only One of Many Problems

By Roadmaster

Fencing is only one of the many problems with which we must wrestle at present; however, this problem has not yet become as acute as we feared, or as some others have, partly because our fencing requirements are well below what they were formerly, and partly because adjacent land owners are well aware of our inability to obtain fencing, since they are in the same predicament themselves.

On my own territory, almost one-third of the right-of-way fence we once maintained is now unnecessary because the state has paralleled the line with improved highways. At other points, the farmers are now raising less stock, particularly horses, than they once raised, so that many of our fences can be maintained to a somewhat lower standard, not of quality but of kind, resulting in smaller material requirements.

It is impossible at present to obtain either new fence wire or wire fencing from the stores department, and metal posts are also out. We are getting creosoted posts and some that are not treated. I have some second-hand wire on hand, released recently from a fence adjacent to a new road, which I dole out when replacements become necessary. I have been able to build board fences satisfactory to two or three farmers, but even this material is getting scarce. One farmer agreed recently to furnish the fencing if we would set the posts and erect the fence, whereupon he went out into the woods and cut a lot of poles, some of them split, which we sent to the treating plant. It is not a very attractive fence, unless one desires that rustic effect, but it is serviceable, it will turn stock and it should last a long time, unless it burns.

Maximum Use of Power Tools

In view of the existing labor shortage, what measures can be taken to insure maximum use of power machines and power tools available? Who should be responsible?

Must Work More Hours

By E. C. Jackson

Supervisor of Maintenance of Way Equipment and Scales, Southern Pacific, Houston, Tex.

This is a question that involves policy of management. It is a fact that there is a widespread and more or less general labor shortage and that this affects the use of power machines and power tools. In normal times, except for some extra gangs, an eight-hour day and a six-day week are considered standard. At present, to work all of the machines, or at least all that can be employed usefully, we have only one alternative, that is, to work longer than eight hours a day and, in some cases, to work on Sundays and holidays. Generally, the men are glad to work up to 10 or more hours a day and this helps to hold men who otherwise would seek employment elsewhere at higher wages.

When working on some of our short branches, we sometimes find it necessary to work as long as may be required to finish to the end of the line and return to camp. This has resulted in as much as 12 to 13 hours continuous work from starting time. However, this saves one day for both men and machines. In this respect, we are about in the position of the farmer—where there is work to do we must of necessity work the time necessary to do it.

Who is responsible? We believe that the roadmaster and other junior supervisory officers should seek authority to make whatever changes are necessary under present circumstances, and that management should give the authority so that the work may proceed at the best possible advantage. These are difficult and perhaps strange times, and we need to meet the changes as they occur. Now is the time, if there ever was such a time, to be on the job, watching and meeting changed demands as they arise. The more promptly these changes are met, the better the results that will follow.

There is one other feature of importance connected with this subject, namely, the securing of necessary repair parts for all types of power machines. We cannot stock these parts in the usual quantities; in fact, for some type of machines, we cannot order the parts until they are actually needed. This is a great handicap. However, where there is a central control of all machines we can prevent many of them from being out of service at the same time and, further, we can shift the machines from place to place, from day to day; using them where they are most needed or where they will give the highest return. Central control of machine personnel is handled in the same way. This helps, because we can thus discontinue some machines or tools temporarily, concentrating on those that are most necessary.

A daily report from all machines in operation is necessary to keep the central office advised of the whereabouts of each machine and of the kind of work it is doing each day. This report also shows whether the crew is complete. With a system seniority roster, we can reduce the complaints of the men to the minimum, as in most cases the oldest qualified man can be assigned as vacancies occur. This means that a constant review must be made of the gang personnel to keep the crews full and to use the men to advantage.

Must Be Maintained

By District Engineer

Economic justification for the employment of power machines and tools depends ordinarily on the length of time they can be kept in service. The war has changed all of this, however, for at present any saving that will release a man for military service, or the use of any equipment that will take the place of a man who has gone, is justified, regardless of the time it is kept in service. On the other hand, any measures that can be taken to insure maximum use and save labor is imperative in the all-out fight in which we are now engaged.

Modern development of labor-saving equipment—and this term is particularly appropriate at this time—has resulted in a machine or tool for almost every maintenance operation. While it is true that many of these machines are difficult to obtain at present, maximum use must be made of those now in service. To do so, necessitates careful assignment and a definite schedule of use. When the machines and tools are assigned to a division or a supervisor's district, the problem of preparing a schedule is comparatively simple. When the assignment is to a region or to the system as a whole, the problem becomes more difficult, particularly as regards seasonal equipment or machines designed for specific purposes.

Division equipment can be assigned by the division engineer who, together

with the roadmasters, supervisors and foremen, is responsible for obtaining maximum use from them. The assignment of regional or system equipment must be made by the engineer maintenance of way or the district engineer. In either case, to insure full utilization of the equipment necessitates a comprehensive schedule, based upon careful studies of the work to be done, when it shall be done, the adaptability of the machines and tools, and the force to be worked, always with a view to the maximum saving in labor.

Seasonal equipment presents its own particular problems. With this equipment, the geographical location of the work must be considered. As an example, too often, the program for weed-destroying machines is based on a predetermined time for doing the work, rather than upon climatic or weather conditions. When the railway is so located that the weed growth is earlier in one section than in another, the weed-destroying equipment may be made to do double duty with maximum efficiency obtained from it with respect to both labor and the amount of work done.

Ditching provides another example, in which the urgency of the need for the work may be the controlling factor, but, if possible, the schedule should be based on the probable most favorable factors of climate and weather. Many other units of equipment designed for seasonal work may be adapted for off-season tasks, making it possible to obtain greater use from them. If this is practicable, both the seasonal and the off-season work should be scheduled carefully to insure maximum utilization of the equipment and minimum manual requirements.

It is often advantageous to schedule certain work to be done first in the area of early spring, moving the machines to colder latitudes as the season advances. Too much emphasis cannot be placed on intelligent and well-considered schedules, according to climatic conditions in both northern and southern territories. There is approximately the same seasonal lag between Chicago and Duluth as there is between Houston or Birmingham and Chicago.

It should not be overlooked that careful maintenance is one of the most important factors in obtaining maximum utilization of power machines and tools. All units should be put in first-class condition during off-season idleness and then maintained rather than repaired during the working season. Every man connected in any way with the use of the equipment has a direct, not a divided, responsibility to see that it is utilized to the maximum. Today the responsibility is multiplied many fold.

How Not to Use Track Jacks

What practices in the use of track jacks tend to shorten their service life? How can they be avoided?

Do Not Overload

By F. R. Layng
Chief Engineer, Bessemer & Lake Erie, Greenville, Pa.

The service life of a track jack will be shortened materially if it is overloaded frequently or if it is abused in handling, such as throwing it off track cars onto the ground or permitting it to stand exposed to the weather indefinitely. Its useful life can be lengthened by avoiding overloading and rough handling. In addition, the rack and lifting pawls should be kept clean. The practice of driving a track jack into place by striking it on the base to force it under the rail should never be permitted. Sufficient space should be provided between the base of the rail and the ballast so that the jack can be inserted without the necessity for driving it. Movable parts should always be kept clean and free from grit. A light lubricant should be applied occasionally to the racks and other movable parts.

It Is a Sturdy Tool

By Supervisor of Track

The track jack is a sturdy and substantial tool, built to withstand rough usage and is not easily damaged when used properly. However, it is subject to much abuse and it is doubtful whether any other tool in railway service is called upon to withstand the punishment that the track jack receives. If it were less sturdy and more fragile, its useful life would be short. Despite the ability it possesses to stand up under all conditions of use and abuse, a surprising number of them are consigned to the scrap pile long before their normal life has been completed.

Examination of 1,272 track jacks received at our reclamation plant as scrap or for repair disclosed that most of the damage resulted from abuse. The principal defects included rack bars bent; rack teeth worn and damaged; lever sockets broken, cracked or distorted; bases bent, cracked or broken; caps missing from rack bars; pawls, fulcrum pins, trunnious and bearings reduced by corrosion and worn through lack of lubrication.

Some of the jacks showed defects from ordinary wear and from causes that could not be avoided, but by far the larger percentage of defects had quite apparently resulted from carelessness and abuse. Of the total number of jacks shipped in during the period under discussion, 954, or 75 per cent, were repaired and returned to service, and 318, or 25 per cent, were scrapped after such parts as could be used to repair other jacks had been removed.

One of the most common forms of abuse, in fact it is nearly universal, of track jacks is failure to lubricate the moving parts. Apparently the importance of lubrication is generally overlooked, for inspection in the field and shop discloses little evidence of oil having ever been used. It should be understood that careful lubrication is of real importance, for it will prolong the service life of the jacks and make their operation much easier. The principal wear on pawls, fulcrum pins, trunnious and bearings is a direct result of lack of oil.

Another undesirable practice is that of using them to the extreme lift without adequate blocking. This practice occurs more frequently when they are used for purposes other than track work, as track raises seldom call for the extreme lift. While they are sometimes necessary, extreme lifts should be avoided when possible, particularly when the load must be carried on the top of the rack bar, because of the danger of bending or breaking the rack bar or the base or both, when the foundation is insecure or there is a tendency for the load to shift. It is better to make such a lift in two or more rises, using blocking to hold each gain.

Track jacks should always be set on level unyielding footings, using sound blocking. Tipping under load places undue strain on the jack and almost invariably results in damage. When used for raising track, the ballast provides a good foundation for the base, but if there is any tendency to yield, blocking should be used, regardless of the use to which the jack is being put. The jack should never be driven under the rail with a sledge or other tool; ample jack holes will permit free manipulation of the jack.

The rack bar should always be vertical when making a vertical lift, particularly when the load is being carried on the head of the rack bar, and should be centered as nearly as possible under the load. Allowing the rack bar to be canted throws a strain upon it and may result in a bent or broken rack bar and possible damage to the base or other parts of the jack. There is also always a possibility that the jack may slip from under the load.

Another practice that not only damages the jack, but often results in personal injuries, is the careless use of a square bar in a round lever socket when the round jack handle has been misplaced or is not available for other reasons. Extreme care should be exercised in the use of a lining bar as a substitute for a round handle, for even when one or more track spikes are inserted into the socket there will be some lost motion, and injury may result to both the jack and the operator. Track jacks are now made with square lever sockets but many of the older designs still remain in service. A little more care give to this important track tool will increase its life.

Most Things Done Wrongly

By W. Woolsey
Section Foreman, Illinois Central, Chicago

Almost every practice in the use of track jacks is done incorrectly, whether from ignorance or indifference, and almost every one tends to shorten its service life, although every one of them can and should be avoided. At present, all track jacks are equipped with emergency trips, the purpose of which is to permit the jack to be released quickly in an emergency. When the jack has been raised to the required height, the lever socket is put into position and the emergency trip is moved into place. To release, it is only necessary to pull down gently on the lever socket. Instead of doing this, however, most jackmen drop the jack bar heavily onto the lever socket, thereby placing an undue strain on the trip. This may cause the trip to fail at a critical moment and result in injuries.

A foreman should select a jackman who knows or can be taught his business and place him in responsible charge of the jack. Then as long as the jack is in the track he should have no other job than that of attending to it. A jackman should never be put to doing, or allowed to do, something else while tending to the jack.

Another bad practice is that of throwing jacks down when through using them. The jack should be placed out of the way, standing. To throw it onto the ground or on the shoulder of the ballast is to cause dirt, sand and other grit to collect in the bearings and to interfere with the seating of the pawls. This may be dangerous, for if the pawls do not enter the rack fully and seat, they may slip under load and injure the jackman.

All bearings and points in contact should be kept lubricated. It is not uncommon for one man to operate a well-lubricated jack easily, where it is difficult for two men to do so if the jack is not lubricated. It is just as easy to train men to operate jacks safely and carefully as it is to allow them to handle them improperly. Correct handling is safer, the output of the gang is greater, and the jack will last considerably longer.

Transporting Gangs

What methods for transporting bridge and building gangs and materials are most suitable today, in view of the greater speeds and frequency of trains and the present restrictions on tires and highway vehicles?

Motor Cars Are Best

By L. G. Byrd
Supervisor of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

It is not debatable that the enormous increase in traffic and the changes in train operation which have resulted from war demands, have presented the maintenance forces with a serious problem in selecting the most suitable means of transporting men and materials to and from points of work. A still further burden has been added by the current restrictions on highway vehicles.

Despite the continued shortage of equipment for moving critical supplies for both military and civilian uses, we are fortunate that we have in service some light box and flat cars that are unsuitable for revenue loading, but which can be moved safely in local trains. We are loading these cars with needed materials and setting them out on spur tracks as close as possible to the points of use. This equipment is also used for shipping material from division headquarters to gangs at outlying points, where larger structures or a number of smaller ones are to be repaired.

The stores department has co-operated by loading materials in quantities large enough to justify a work train for unloading and distributing. The bridge and building department also co-operates with the roadmaster in handling ties and ballast, thus insuring a full day for the work train.

Under present restrictions, the most satisfactory way to transport men to and from work is by track motor car and trailer. A line-up is obtained from the dispatcher and the cars are moved under flag protection, with instructions to avoid delays to trains. On branch and other light traffic lines, motor cars and trailers are used with success for transporting both men and materials to points of work. Here the operation is economical as well as otherwise suitable.

Use Motor Cars and Trucks

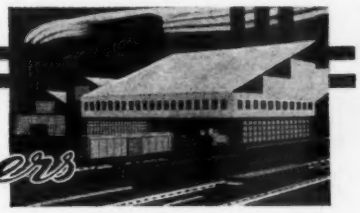
By Division Engineer

For almost ten years the number of trains grew less progressively, particularly passenger trains, while our purchases of automotive highway vehicles increased, although somewhat gradually to be sure. We were, therefore, in position to choose our means of transportation for both men and materials. We used track motor cars when all or most of the gang was to be moved and continued car-load and other large shipments as we have done for years. However, we developed the practice of delivering materials for small jobs by trucks, usually taking along at the same time the few men needed for the work.

Today, we are handling the heaviest traffic in our history and most of our trains are running on shorter schedules than ever before. We do not, therefore, attempt to handle heavily loaded trailers or push cars for any distance, even under flag protection, for it is almost a criminal offense to delay a train if it can be avoided. We do carry light loads on motor-car trailers, but we always get a line-up of trains and obtain permission from the dispatcher to make the trip under time limitations. We also move men on motor cars, as before, but each movement is under a line-up.

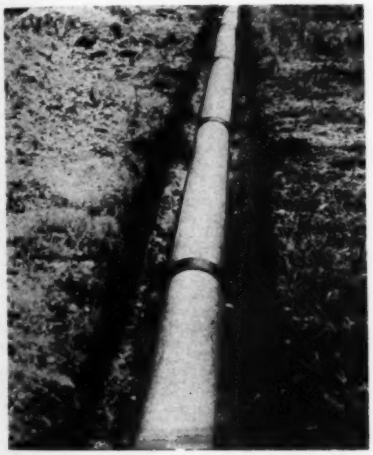
Although we did not have enough trucks when the restrictions on these vehicles became effective, we are using what we had, and we have also been able to purchase several more, so that we are still able to make some deliveries of men and materials by highway.

PRODUCTS of Manufacturers



Asbestos-Cement Pipe

THE Ruberoid Company, New York, recently introduced a specially-fabricated form of asbestos-cement pipe, known as Eternit A/C pressure pipe, which is said to have advantage for use in water lines, drainage systems and related applications in the railroad field. It is pointed out that the new pipe is manufactured by an extrusion process which is claimed to insure uniform measurements and extremely smooth surfaces, both inside and out, without machining. For this reason, it is said that, when necessary, the pipe can be cut in the field with a hack saw and coupled immediately, without machine preparation.



Installation of Eternit A/C Pressure Pipe

This new product is made from a closely-controlled mixture of asbestos fiber and Portland cement, both of which are non-critical materials. Since it is a non-conductor of electricity, it is pointed out that the pipe is not affected by stray ground currents, and, therefore, that it may be safely laid contiguous to electric power lines without danger of galvanic corrosion. Furthermore, it is claimed that the pipe is immune to tuberculation and other forms of internal corrosion and that, for this reason, a full-size passage is maintained, eliminating the expense of periodic cleanings or of increasing the pumping pressure to compensate for a reduced opening. The pipe is made in standard lengths of 13 ft. and in diameters up to and including 6 in. For the time being, it is available only in the states along the eastern seaboard.

I-R Pneumatic Track Wrenches

THE Ingersoll-Rand Company, Phillipsburg, N. J., has introduced two new power track wrenches to replace its Models 99 and 99E piston-type wrenches. The new units, known as sizes R44 and R44E, are powered with Multi-Vane air motors and are said to be more powerful, and yet lighter in weight, than the models that they replace. These wrenches are designed for applying or removing track bolts in connection with repair work or in laying new rail. Size R44E is a heavy-duty machine which, it is said, can be used to tighten or run-off the nuts on the largest sizes of track bolts. The R44 track wrench is a lighter, faster machine than size R44E, and is designed for use on all sizes of track bolts where a lighter machine is desired.

Showing Ingersoll-Rand Track Wrenches in Operation

New Book

AREA Proceedings

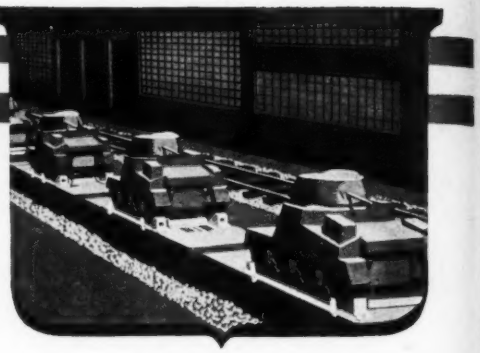
PROCEEDINGS of the American Railway Engineering Association for 1943. 732 pages, 6 in. by 9 in. Bound in cloth or half Morocco. Published by the Association, 59 East Van Buren Street, Chicago. Price, cloth $8, half Morocco $9.

This volume contains the complete record of the activities of the association for the year ending in March, 1943, and includes the reports of the 25 standing and special committees, together with the discussion of the reports (which discussion was carried on by mail, because the annual convention was not held this year). It also includes two monographs: Pile Tests Point to Limitations of Current Specifications for Bearing Power by Roscoe Owen, construction engineer, Missouri Pacific Lines, Houston, Tex., and Stress Measurements in the Web of Rail by G. M. Magee and E. E. Cress, research engineer and assistant engineer of tests, respectively, Engineering Division, A. A. R.

As usual the reports cover a wide range of subjects, providing valuable reference material on many phases of railway maintenance and operation. Among the 130 subjects presented in this volume were the results of special field tests on impact on short span steel briges; modern roadway construction and protection methods; ballast specifications and tests; data on the purchases of controlled cooled and Brunorized rail; investigations on joint bar failures and the cause of shelly spots and head checks in rail; consolidation of foundation soils by pressure grouting; the effect of volume of traffic on railway operating expenses; increasing labor supply to overcome acute shortages and the characteristics of modern refrigerating systems.

Valuable information is also given on fastenings for continuous welded rail; welding manganese castings; and on types of water for Diesel locomotives and for air conditioning.

NEWS of the Month



S. P. Requires Coach Reservations

Passengers traveling by coach on the Southern Pacific System are now required to make advance reservations under a ruling which went into effect on July 17. The new order includes service men who, however, are given preference. The reservations are made for specific trains but not for specific cars or seats.

Eastern Oil Deliveries Over Million Barrels Daily

The movement of petroleum products into the Atlantic Coast territory by rail exceeded a million barrels a day for the first time in history in the week ended June 26, according to a statement by Petroleum Administrator Ickes. The daily average for that week was 1,060,744 barrels.

Wheeler Would Bar Railroads From Highway Field

Chairman Wheeler of the Senate committee on interstate commerce has indicated that, upon the conclusion of the Senate's Summer recess he intends to introduce "proposed legislation to prevent railroads from owning buses and trucks." While his statement indicated that the legislation proposed would seek to exclude railroads from the bus and truck fields only, Senator Wheeler added that he did not believe railroads should own air transport or water transportation facilities.

5,000 Box Cars to be Built

The War Production Board has authorized the costruction of 5,000 box cars in the latter part of this year, and may allot sufficient materials for the construction of 6,000 more, according to a statement made by R. E. Clark, manager of the Closed Car section of the Association of American Railroads, before a meeting of the Mid-West Shipper's Advisory Board at Chicago on July 8.

The board's campaign to get more freight cars and other equipment for the railroads was supported by a message from Joseph B. Eastman, director of the Office of Defense Transportation, which reiterated his previous statements that serious consequences may result if the ODT's requests for materials and equipment for the railroads are not met by the War Production Board. He added that the ODT will continue to press vigorously for more equipment, not only for the railroads but also for other forms of transportation.

Tie Renewals 3.7 Per Cent Higher

Although war-time construction demands of the Army and Navy have created difficulties in the procurement of ties for railroad maintenance, 70 railways in the United States and Canada inserted in renewals more ties per mile of maintained track in 1942 than during the previous year, while 63 renewed less ties and one applied the same number. Of these 134 roads, 132 are in the United States and two are in Canada (statistics for the Canadian National were not available when the report was made).

The roads in the United States inserted 48,168,240 new ties and 447,988 second-hand ties, or a total of 48,616,240 ties, in replacement in 1942, compared with 46,-875,815 in 1941, an increase of 1,740,413, or 3.7 per cent. The two Canadian roads inserted 3,076,672 ties in 1942, compared with 3,170,447 in 1941, a decrease of 93,-775, or 2.9 per cent. These figures are drawn from the tabulation of statistics relating to tie renewals compiled by the Bureau of Railway Economics from reports made to the Interstate Commerce Commission and made public by the Tie Committee of the American Railway Engineering Association.

Roosevelt Expected to Act in Non-op Wage Check-Mate

Presidential action is expected soon in connection with the recent decision of Economic Stabilization Director Fred M. Vinson to stay the recommended eight cents per hour wage increase for non-operating employees of the railroads. Under Director Vinson's ruling, the case would be remanded to the National Railway Labor Panel emergency board which heard it, but Dr. I. L. Sharfman, who was chairman of that board, takes the position that the board no longer exists and, further, that he has no authority to reconvene it.

Dr. Sharfman's stand received backing when Dr. William M. Leiserson, chairman of the Panel, declared that he likewise has no authority to recall the Sharfman board, in the absence of action on the part of President Roosevelt, who may recall the emergency board as he did in 1941 when the labor organizaions rejected the recommendations of the board which heard the general wage case of that year. The action of the president at that time brought about the so-called mediation settlement of December, 1941.

Director Vinson has indicated that he disapproved the recommended eight cent increase because it was based on "gross inequities" shown by comparisons of railway wages with those of other industries. This was in reference to the board's reliance on the stabilization program loophole permitting adjustment to "aid in the effective prosecution of the war or to correct gross inequities," which was restored to wartime wage procedures by former Economic Stabilization Director James F. Byrnes' directive of May 12 after having been removed by President Roosevelt's "hold-the-line" order of April 8. In this connection Director Vinson took the position that the board's use of the "gross inequities" device was not justified under the presidential order as modified by the Byrnes' directive.

On July 24 at the convention of the Brotherhood of Railway Maintenance of Way Employees at Detroit, Mich., E. E. Milliman, president of the union, was authorized to withdraw the no-strike pledge made to President Roosevelt and take "whatever further action" may be necessary to enforce wage increase demands.

M. of W. Workers Needed— Survey of Retirement Board

The latest issue of Personnel Needs and Surpluses in the Railroad Industry, issued monthly by the United States Railroad Retirement Board, dated June 1 and revised June 29, shows that "employment needs of the railroad industry continue critical and that surpluses remain negligible." This mimeographed bulletin is based on reports from the railroads and is composed of three exhibits: Exhibit A —Personnel Needs and Surpluses by Occupations; Exhibit B—Needs and Surpluses by Geographical Areas; and Exhibit C—Needs and Surpluses on Individual Railroads. In Exhibit A those occupations in the maintenance and engineering departments in which the greatest needs were shown are as follows:

Occupations	*Men Needed*
Bridge and building apprentices	141
Bridge and building carpenters	770
Bridge and building helpers and laborers	1,184
Bridge and building painters	182

Bridgemen	33
Bridgemen (steel)	11
Carpenters	601
Carpenter helpers	510
Draftsmen	46
Extra gang trackmen	12,559
Maintenance of way foremen	22
Painters	317
Painter helpers and apprentices	93
Rodmen	40
Section men	27,903
Watchmen (crossing)	133
Water service helper	69
Water service mechanic	10
Water service men	77
Welders	43

The most important individual needs of some* of the largest roads are as follows:

Atchison, Topeka & Santa Fe.—Bridge and building helpers—112; bridge and building carpenters—53; bridge and building laborers—18; bridge and building painters—36; extra gang trackmen—1,881; section men—1,639; water service helpers—11; and water service mechanics—10.

Atlantic Coast Line.—Bridge and building laborers—33; extra gang trackmen—50; and section men—291.

Baltimore & Ohio.—Carpenters—16; carpenter helpers—36; extra gang trackmen—350; and section men—984.

Chesapeake & Ohio.—Carpenter helpers—21; bridge and building laborers—54; extra gang trackmen—50; and section men—308.

Chicago & North Western System (including the Omaha).—Bridge and building carpenters—44, carpenter helpers—18; maintenance of way foremen—10; bridge and building laborers—43; extra gang trackmen—120; and section men—198.

Chicago, Burlington & Quincy.—Bridge and building helpers—29; bridge and building laborers—21; painter helpers—11; tie handlers—19; extra gang trackmen—874; and section men—481.

Chicago, Milwaukee, St. Paul & Pacific.—Bridge and building carpenters—36; extra gang trackmen—901; section men—933; and welders—10.

Chicago, Rock Island & Pacific.—Bridge and building helpers—28; bridge and building carpenter helpers—20; bridge and building painters—10; extra gang trackmen—220; and section men—352.

Great Northern.—Bridge and building helpers—85; bridge and building carpenters—20; painters—12; extra gang trackmen—50; and section men—1,340.

Illinois Central.—Carpenters—24; bridge and building carpenters—20; painters—10; and section men—133.

Louisville & Nashville.—Bridge and building laborers—36; and section men—190.

Minneapolis, St. Paul & Sault Ste. Marie.—Carpenters helpers—39; extra gang trackmen—150; and section men—120.

Missouri Pacific Lines.—Bridge and building helpers—149; bridge and building carpenters—78; carpenter helpers—44; bridge and building laborers—63; extra gang trackmen—1,179; and section men—348.

New York Central System.—Bridge and building laborers—56; painters—43; extra gang trackmen—225; and section men—2,594.

Northern Pacific.—Bridge and building helpers—92; bridge and building carpenters—95; extra gang trackmen—1,480; and section men—143.

St. Louis-San Francisco.—Bridge and building helpers—54; extra gang trackmen—270; and section men—305.

Seaboard. — Painters—14; tie handlers—20; extra gang trackmen—95; and section men—168.

Southern.—Bridge and building apprentices.—141; bridge and building laborers—13; extra gang trackmen—187; and section men—283.

Southern Pacific (Pacific System).—Crossing watchmen—10; painters—27; rodmen—18; section men—5,036; and water service men—46.

Southern Pacific Lines in Texas and Louisiana.—Bridge and building helpers—62; and section men—185.

Union Pacific.—Bridgemen (steel)—11; carpenters—54; bridge and building carpenters—165; carpenter helpers—171; bridge and building laborers—16; painters—14; bridge and building painters—96; extra gang trackmen—2,537; section men—2,800; water service men—22; and water service helpers—46.

*The Pennsylvania is not included because its report was not received by the Retirement board in time to be included in the bulletin.

Personal Mention

General

Paul D. Fox, whose promotion to deputy comptroller of the Pennsylvania, with headquarters at Philadelphia, Pa., was reported in the July issue of *Railway Engineering and Maintenance,* was born at Richmond, Va., on October 8, 1908, and graduated in civil engineering from the Virginia Military Institute, Lexington, Va., in 1930, later attending the University of Pennsylvania for post-graduate work in accounting. Mr. Fox entered the service of the Pennsylvania on July 14, 1930, as assistant in the engineering corps in the maintenance of way department, Maryland division, at Wilmington, Del. He later served in that capacity on the Williamsport, Philadelphia and Atlantic divisions until May, 1932, at which time he was furloughed because of a reduction in personnel. He then entered the retail sales department of the Standard Oil Company of New Jersey. He returned to the Pennsylvania on April 22, 1934, thereafter serving as assistant supervisor of track successively on the Philadelphia division at Harrisburg, Pa., and the Tyrone, Altoona and Middle divisions. On November 1, 1935, he was assigned to special duty in the office of the vice-president and comptroller, and on January 16, 1937, he was appointed supervisor of track at Warren, Pa., returning to the vice-president and comptroller's department in October of the same year. On January 15, 1939, Mr. Fox was appointed assistant to the comptroller and on October 1, 1941, he was appointed auditor of disbursements, with headquarters at Philadelphia, the position he was holding at the time of his recent appointment as deputy comptroller.

Paul D. Fox

J. M. Miller, transmaster on the Western Maryland, and an engineer by training and experience, has been promoted to assistant superintendent of the Elkins division, with headquarters at Cumberland, Md. Mr. Miller is now a vice-president of the Roadmasters and Maintenance of Way Association.

P. M. Roeper, whose appointment as superintendent of the Wilkes-Barre division of the Pennsylvania, with headquarters at Sunbury, Pa., was reported in the July issue, was born at McKeesport, Pa., and attended the University of Southern California and the Carnegie Institute of Technology. He entered the service of the Pennsylvania in 1928 as an assistant on the engineering corps at Middletown, Pa., subsequently holding various positions at Sunbury, Chester, Newport, Hollidaysburg and New Castle, Pa. In January, 1942, Mr. Roeper was advanced to division engineer of the Panhandle division, with headquarters at Pittsburgh, Pa., holding that position until his new appointment.

Curtis A. McRee, assistant superintendent of the North Carolina division of the Seaboard, and an engineer by training and experience, has been promoted to superintendent of the Virginia division, with headquarters at Raleigh, N.C. Mr. McRee was born at Watkinsville, Ga., on January 22, 1898, and was graduated in civil engineering from the Georgia Institute of Technology in 1922. He entered railroad service on January 8, 1923, as an engineering inspector in the office of the chief engineer of the Seaboard at Norfolk, Va. From February 14, 1924, to December 15, 1933, he served in various capacities in the maintenance of way and structures department, including such positions as assistant to the division engineer, assistant division engineer, assistant roadmaster, division engineer, and roadmaster, becoming trainmaster on the latter date. Mr. McRee was appointed assistant superintendent of the North Carolina division on May 15, 1942, and remained in that position until his recent promotion.

Starr Whitney Fairweather, chief of research and development on the Canadian National, and an engineer by training and experience, has been appointed vice-president of research and development, with headquarters as before at Montreal, Que. Mr. Fairweather was born at Apohaqui, N.B., on April 30, 1892, and studied engineering at Acadia and McGill universities. He entered railroad service in May, 1916, as assistant engineer on the car ferry terminals to Prince Edward Island, in the Department of Railways and Canals, and in 1917 became assistant engineer on

Starr Whitney Fairweather

the Quebec Bridge Commission. In 1918 he became structural engineer in the Department of Railways and Canals, and in 1920 he was appointed office engineer of that department. Mr. Fairweather joined the Bureau of Economics of the Canadian National as assistant to the director in 1923, later being advanced successively to assistant director and director. He became chief of research and development of the Canadian National in 1939.

Morton S. Smith, division engineer of the Long Island Railroad (a subsidiary of the Pennsylvania), with headquarters at Jamaica, N.Y., has been promoted to superintendent of the Logansport division of the Pennsylvania, with headquarters at Logansport, Ind. Mr. Smith was born at Hughesville, Pa., on July 1, 1906, and attended Pennsylvania State College. He entered railway service on June 24, 1929, as an assistant on the engineer corps of the Pennsylvania at Lancaster, Pa., and in the same year he was appointed assistant supervisor of track, serving in that capacity on the Baltimore, Philadelphia, Maryland and Middle divisions. In 1933 Mr. Smith was promoted to supervisor of track on the Monongahela division and until 1939 he served in the same capacity on various other divisions. In 1940 he was advanced to division engineer of the Monongahela division and in February, 1943, he was transferred to the Long Island, with headquarters at Jamaica, N.Y., remaining in that location until his new appointment, effective July 1.

William J. Bergen, engineering assistant to the president of the New York, Chicago & St. Louis (Nickel Plate), with headquarters at Cleveland, Ohio, has retired from active duty but will serve in

William J. Bergen

an advisory capacity. Mr. Bergen was born at Waterbury, Conn., on February 16, 1872, and graduated in civil engineering from Rennsselaer Polytechnic Institute in 1897. From 1889 to 1893 he served as rodman, instrumentman and paving and sewer inspector of the city engineer's office at Waterbury, and from 1897 to 1899 he was rodman, instrumentman and chief computer of the ship canal survey from Oswego, N.Y., to Utica, for the War department. In 1899 Mr. Bergen was appointed assistant engineer of construction of the Burlington & Missouri River (now the Chicago, Burlington & Quincy), and later was promoted to division engineer and engineer on construction. In June, 1901, he was appointed assistant engineer of the Nickel Plate, subsequently serving as chief supervisor of track, first assistant to the chief engineer ,and engineer of grade elimination. During the period of federal control, Mr. Bergen served as chief engineer for the corporation. In March, 1920, he was appointed consulting and valuation engineer. In September, 1924, he was advanced to engineering assistant to the president and during the next ten years he was in charge of the road's interests in the Cleveland Terminal development.

L. K. Sorensen, assistant general manager of the Eastern lines of the Chicago, Milwaukee, St. Paul & Pacific, has been promoted to general assistant to the chief operating officer, with headquarters as before at Chicago, a newly-created position. **John P. Kiley,** assistant to the general manager, has been advanced to assistant general manager of the Eastern lines, with headquarters as before at Chicago, succeeding Mr. Sorensen. Mr. Sorensen was born in Denmark on April 27, 1888, and entered the service of the Milwaukee on August 14, 1907, as a carpenter at Savanna, Ill., later being transferred to Harlowton, Mont. On October 15, 1916, he was promoted to bridge and building foreman at Harlowton and on November 1, 1919, he was advanced to chief carpenter, with the same headquarters. Mr. Sorensen was promoted to trainmaster at Aberdeen, S.D., on November 5, 1925, and later being advanced to division superintendent, general superintendent and to assistant general manager of the Eastern lines.

Mr. Kiley was born in Chicago on August 13, 1895, and graduated in civil engineering from Villanova College, Pa., in 1915. He entered railway service in June, 1915, in the engineering department of the Milwaukee, where he was engaged on track elevation work and was later assigned to federal valuation work. In 1930, he was appointed engineering assistant in the office of the chief financial officer at Chicago, and on January 16, 1941, he was appointed auditor of investment and joint facility accounts. In December, 1942, Mr. Kiley was promoted to the position he held at the time of his new appointment, effective July 1.

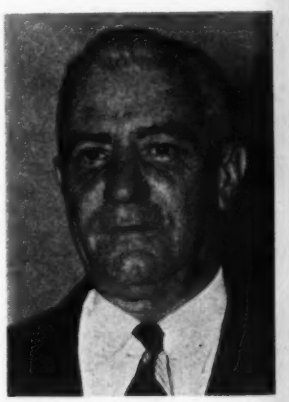
Engineering

Gage Haselton, assistant division engineer on the Portland division of the Southern Pacific, has been promoted to division engineer, with headquarters as before at Portland, Ore., succeeding **H. A. Hampton,** whose retirement was reported in the July issue.

Willard R. Baker, whose promotion to division engineer on the Pecos division of the Atchison, Topeka & Santa Fe, with headquarters at Clovis, N.M., was reported in the July issue, was born at Petty, Tex., on November 6, 1904, and attended Transylvania College and the University of Texas. He entered railway service as a chainman on the Santa Fe on April 22, 1923, subsequently serving as rodma draftsman and transitman at vario points on the road until 1924, when he a tended the University of Texas. M Baker returned to the Santa Fe in Ju 1925, and was later andvanced to balla inspector in the chief engineer's office Amarillo, Tex. In August, 1936, he w promoted to office engineer, with hea quarters at Clovis, and later served ballast inspector, transitman and assi ant engineer. In January, 1941, he w appointed foreman of a special wat service gang on the Western lines and May 6, 1943, he was advanced to roa master at Clovis, holding that positi until his new promotion, effective June

R. W. Grigg, division engineer on t Pennsylvania, with headquarters at Te Haute, Ind., has been transferred to t Long Island Railroad (part of the Pen sylvania), with headquarters at Jamai L.I., to succeed **Morton S. Smith,** wh promotion to superintendent is noted el where in these columns.

Thomas H. Friedlin, chief lumber a tie inspector of the New York Centr has been appointed to the newly-crea



Thomas H. Friedlin

position of timber engineer, with hea quarters as before at New York. **L. Slattery,** chief lumber and tie inspec with headquarters at Cleveland, Ohio, h been appointed to the newly-created po tion of general lumber and tie inspect with the same headquarters. **L. W. Pe** has been appointed assistant to the ti ber engineer, with headquarters at N York.

Mr. Friedlin was born on September 1888, at Portsmouth, Va., and received higher education at Virginia Polytech institute, graduating in 1911. He enter railroad service in the same year a chainman on the Pennsylvania division the New York Central, and subsequen served on that division as a rodm draftsman, transitman, and bridge insp tor. In 1915, he was appointed assist treatment inspector at the compa treating plant at Rome, N.Y., and in following year he became general tie spector at Mobile, Ala. In 1920, Friedlin was promoted to chief lum and tie inspector at New York, wh position he held until his recent pro tion.

A. G. Humphries, general scale inspector on the Southern Pacific at West Oakland, Cal., has been promoted to water service engineer, with headquarters at San Francisco, Cal., a newly-created position. **W. J. Stone** has been appointed general scale inspector at West Oakland, succeeding Mr. Humphries.

H. L. Holderman, supervisor of the Escanaba tie treating plant of the Chicago & North Western at Escanaba, Mich., has been promoted to acting division engineer of the Black Hills division, with headquarters at Chadron, Neb., succeeding **H. L. Barr,** who has been granted a leave of absence to enter military service.

C. H. Holtzworth, special engineer of the Baltimore & Ohio, has been appointed assistant to the chief engineer, with headquarters as before at Baltimore, Md.

C. H. Holtzworth

Born in April, 1893, at Huntington, W. Va., Mr. Holtzworth entered railroad service on October 1, 1909, as a clerk in the freight office of the Baltimore & Ohio at Huntington. On July 15, 1916, he was transferred to the engineering department, later becoming chief clerk to the district engineer, and in May, 1918, he was transferred to Baltimore. Entering the services of the United States Army two months later, Mr. Holtzworth was sent with a special training detachment to Richmond, Va. Following his release from military service on February 3, 1919, he returned to the engineering department of the Baltimore & Ohio as a levelman at Pittsburgh, Pa. In March of the same year he became chief clerk and special accountant, and in 1931 he received additional special assignments under the chief engineer at Pittsburgh. On April 16, 1942, Mr. Holtzworth was sent to Baltimore as engineer in charge of special assignments, the position he held at the time of his recent promotion.

F. P. Filippelli, assistant division engineer on the Pennsylvania at Baltimore, Md., has been promoted to division engineer of the Toledo division, with headquarters at Toledo, Ohio, succeeding **K. A. Werden,** who has been transferred to the Cincinnati division, with headquarters at Cincinnati, Ohio, replacing **A. W. Duke.** Mr. Duke has been transferred to the Fort Wayne division, with headquarters at Fort Wayne, Ind., succeeding **A. H. Stimson,** who has been transferred to the Eastern division, with headquarters at Pittsburgh, Pa. **C. R. Bergman,** supervisor of track at Cresson, Pa., has been advanced to assistant division engineer at Baltimore, replacing Mr. Filippelli.

Mr. Filippelli was born at Harrisburg, Pa., on March 17, 1893, and attended Pennsylvania State college. He entered railway service in May, 1917, as a rodman on the Pennsylvania at Harrisburg, and in May, 1918, he was promoted to assistant supervisor of track, serving in that capacity at Titusville, Pa., Bordentown, N.J., and Baltimore, Md. A short time later Mr. Felippellia was advanced to supervisor of track and served at various points on the road until January 1, 1936, when he was promoted to assistant division engineer with headquarters at Baltimore.

Charles V. Chamberlin, whose promotion to assistant engineer of track on the New York Central, with headquarters at New York, was reported in the July issue of *Railway Engineering and Maintenance,* is a native of Unionville, Conn., and was born on June 24, 1886. He is a graduate in civil engineering of Yale university, and entered railway service with the New York Central on December 3, 1907, as a rodman at Albany, N.Y., becoming a draftsman on September 1, 1908, and a transitman on January 1, 1909. On December 7 of the same year, he became a bridge inspector at Albany, and on May 21, 1911, he was promoted to assistant supervisor of buildings with the same headquarters. On July 1, 1919, Mr. Chamberlin was transferred to the valuation department as an assistant engineer at New York, becoming an engineering computer in the same department on August 1, 1921. On December 1, 1926, he became an assistant engineer on the Electric division, with the same headquarters, being advanced to assistant division engineer of the same division on March 1, 1941. He was holding the latter position at the time of his appointment as assistant engineer of track.

C. T. Gunsallus, whose promotion to division engineer on the New York Central, Buffalo and East, with headquarters at Watertown, N.Y., was reported in the July issue, was born on December 6, 1899, at Beach Creek, Pa., and was graduated in civil engineering from Pennsylvania State college. He entered the service of the New York Central on March 16, 1920, as a chainman at Jersey Shore, Pa., being advanced to rodman at Utica, N.Y., on June 1, 1925, and thence to transitman at the same point on August 1, 1925. Two years later, he was promoted to assistant supervisor of track with headquarters at Charlotte, N.Y., being transferred to Newburgh, N.Y., on August 1, 1929, and thence to Beacon, N.Y., on July 1, 1934. He was promoted to supervisor of track with headquarters at Richland, N.Y., on June 1, 1936, being transferred to the Electric division with headquarters at New York on November 1, 1937, and thence to the Eastern division with headquarters at Beacon, N.Y., on July 1, 1940. He was located at the latter point at the time of his recent promotion to division engineer.

Joseph A. Noble, whose promotion to district engineer, Southern district, on the Western lines of the Atchison, Topeka & Santa Fe, was reported in the July issue of *Railway Engineering and Maintenance,* was born at Bonham, Tex.,

Joseph A. Noble

on November 12, 1888, and received his education at the University of Texas. He entered railway service in 1907 as a rodman on the Santa Fe at Center, Tex. Later he served as levelman, transitman, location engineer and assistant bridge inspector at various points in Texas, Oklahoma, New Mexico and Kansas until April, 1914, when he was appointed a draftsman at Amarillo. In 1915 Mr. Noble was appointed chief clerk to the chief engineer, with the same headquarters and in 1917 he obtained a leave of absence to serve as a captain in the Engineer Corps of the U. S. Army. In September, 1919, Mr. Noble returned to the Santa Fe as division engineer at LaJunta, Colo., being transferred to the Pecos division, with headquarters at Clovis, N.M., on September 1, 1930, where he remained until his new appointment, effective June 8.

A. E. Benson, whose promotion to division engineer of the Sioux City district of the Iowa division and the Northern Iowa division of the Chicago & North Western, with headquarters at Sioux City, Iowa, was reported in the April issue, entered railway service on April 1, 1913, as a tapeman on the Galena division at Chicago. He subsequently served as rodman, instrumentman and assistant engineer, with the same headquarters, until 1922 when he left railway service. On September 20, 1926, Mr. Benson returned to the North Western to work on improvements at Proviso, Ill., where a freight classification yard was under construction. On May 22, 1927, he was promoted to roadmaster, with headquarters at Fremont, Neb., and later he was transferred to Sterling, Ill. In 1942, Mr. Benson was appointed assistant engineer on the Galena division, holding that position until his new appointment, effective April 1.

Thomas O. Manion, whose promotion to division engineer on the Missouri Pacific, with headquarters at Little Rock, Ark., was reported in the July issue, was born at Benton, Kan., on July 18, 1903, and at-

tended the U. S. Military Academy (West Point). He first entered railway service, in August, 1917, on the Missouri Pacific as a water boy on an extra gang, later returning to school. He returned to the Missouri Pacific in 1927, as a rodman on the Wichita division, subsequently serving as instrumentman, section foreman, extra gang foreman, and again as instrumentman. In 1937 Mr. Manion was promoted to assistant engineer on the Missouri-Illinois (a subsidiary of the Missouri Pacific), and on August 1, 1942, he was appointed roadmaster on the Missouri Pacific, with headquarters at El Dorado, Ark., holding that position until his new appointment, effective May 1.

Harry A. Hampton, whose retirement as division engineer on the Portland division of the Southern Pacific was reported in the July issue, was born in Portland on September 21, 1882, and was educated at the University of Oregon, from which he was graduated in 1907. He entered railway service in December, 1907, as an instrumentman with the Oregon-Washington Railroad and Navigation Company (now part of the Union Pacific) at Portland, where he remained until April, 1908, when he entered the service of the Southern Pacific, as an instrumentman in the maintenance of way department. He served in this capacity and later as office engineer until November, 1917, when he was promoted to principal assistant engineer of the Portland division with headquarters at Portland, which position he held until 1922 when he was advanced to the position he held at the time of his retirement.

I. W. Newman, whose promotion to assistant division engineer on the Cincinnati division of the Louisville & Nashville, with headquarters at Latonia, Ky., was reported in the July issue, was born at Louisville and attended Rose Polytechnic Institute. He was employed in the engineering departments of the Pennsylvania and later of the Missouri Pacific. In May, 1920, he went with the L. & N. as a draftsman in the chief engineer's office at Louisville, being advanced to assistant engineer in that office in October, 1925. In January, 1942, he became assistant engineer on the Cincinnati division, returning to the chief engineer's office in the same capacity in January, 1943, and holding that position until his new appointment.

Track

Kenneth Lieber, assistant supervisor of track on the Pittsburgh division of the Pennsylvania, with headquarters at Johnstown, Pa., has been promoted to supervisor of track on the Indianapolis division, with headquarters at Columbus, Ind., succeeding **G. M. Smith,** who has been transferred to the Columbus division, with headquarters at Piqua, Ohio. **L. S. Strohl,** assistant in the engineering corps of the Pittsburgh division, has been advanced to assistant supervisor of track, with headquarters at Cresson, Pa., succeeding **W. J. Ott,** transferred to the Middle division, with headquarters at Harrisburg, Pa. He replaces **W. B. Hoffman** who succeeds Mr. Lieber at Johnstown.

Cleo R. Rook, whose promotion to roadmaster on the Chicago, Burlington & Quincy, with headquarters at Orleans, Neb., was reported in the May issue, was born at Warsaw, Mo., on June 29, 1907, and entered railway service on April 1, 1923, as a section laborer on the Burlington at Trenton, Neb. He subsequently served as section foreman at various points in charge of surfacing and construction gangs until February, 1938, when he was promoted to track supervisor, with headquarters at Wray, Colo., holding that position until his new appointment, effective March 1.

E. K. Pearson, whose promotion to roadmaster of sub-division 2 of the Madison division of the Chicago & North Western, with headquarters at Madison, Wis., was reported in the June issue, was born at Morrison, Ill., on April 12, 1900, and entered railway service on June 19, 1924, as a section laborer on the North Western at Union Grove, Ill. In October, 1925, he was advanced to section foreman, with headquarters at La Fox, Ill., and until 1941 he was in charge of surfacing and steel gangs at various points on the road. In October, 1942, Mr. Pearson was promoted to assistant roadmaster at Fremont, Neb., and in January, 1943, he was transferred to Mason City, remaining at that location until his new appointment, effective May 1.

Joseph H. Bell, whose promotion to roadmaster, Second district of the Valley division of the Atchison, Topeka & Santa Fe, with headquarters at Fresno, Cal., was reported in the July issue, was born at Demming, N.M., on May 30, 1907, and entered railway service as an assistant extra gang foreman on the Albuquerque division of the Santa Fe, subsequently serving as section foreman at various points on the line. In October, 1940, he was promoted to track supervisor at Oceanside, Cal., and two years later he was advanced to the position he held at the time of his new appointment, effective June 1.

Arthur B. Cox, whose promotion to roadmaster on the Southern Pacific, with headquarters at Gila, Ariz., was reported in the May issue, was born at Allen, Okla., on October 1, 1909, and entered railway service on February 26, 1933, as a section laborer on the Southern Pacific. He served in several other capacities at various points on that road and in 1940 he was advanced to assistant rail gang foreman at Gila. In May, 1942, Mr. Cox was promoted to general foreman, with the same headquarters, holding that position until his new appointment, effective February 1.

Earl R. Bishop, whose promotion to roadmaster on the Southern Pacific, with headquarters at Niland, Cal., was reported in the May issue, was born at Fresno, Cal., on June 11, 1907, and attended Oregon State college. He entered railway service on August 25, 1925, as a file clerk in the general offices of the S. P., and one year later was transferred to the engineering department in the general office at San Francisco, Cal. In March, 1927, he was transferred to the engineering department of the Coast division and then enrolled at Oregon State college for one year, returning to the engineering department of the Coast division in 1928. In June, 1929, Mr. Bishop again attended Oregon State College, and six months later he returned to the Coast division where he served as rodman, draftsman, flagman, track laborer, machine operator and assistant track foreman. In 1937 he was advanced to section foreman and in November, 1941, he was promoted to general foreman, holding that position until his new appointment, effective March 16.

J. P. Morrissey, general foreman on the Erie at Port Jervis, N.Y., has been promoted to supervisor of track, with headquarters at Dunmore, Pa., to succeed **H. S. Trenholm,** who has been transferred to Campbell Hall, N.Y., to succeed **L. H. Judd,** who has been transferred to Paterson, N.J., to replace **R. M. Cunningham,** who has been transferred, at his own request, to North Newark, N.J. Mr. Cunningham replaces **J. R. MacAsy,** who has retired because of ill health.

Vincent V. Holmberg, supervisor of track on the Belt Railway of Chicago at Clearing, Ill., has been appointed supervisor of bridges and buildings of the Chicago & Western Indiana, with headquarters at Chicago, succeeding **Martin Meyer,** who has resigned to accept other employment.

John E. Price, whose promotion to supervisor of track on the New York Central, with headquarters at Corning, Ohio, was reported in the July issue, was born at Pickerington, Ohio, on June 26, 1900, and entered railway service on September 3, 1918, as a section laborer on the New York Central at Pickerington. On February 4, 1925, he was promoted to section foreman, and in May, 1939, he was advanced to extra gang foreman at Peoria, Ohio, later serving as section foreman at Basil, Ohio. In January, 1940, Mr. Price was advanced to assistant supervisor of track, with headquarters at Columbus, Ohio, holding that position until his new appointment.

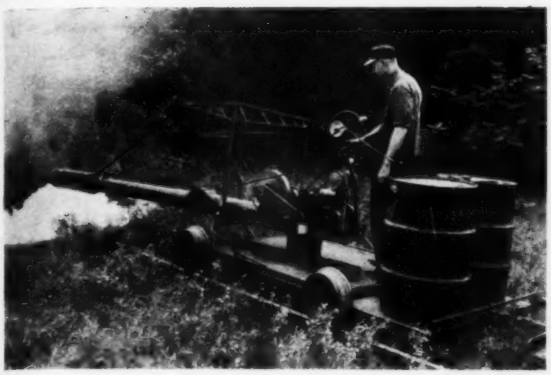
J. P. Hiltz, Jr., branch-line supervisor of track on the Pennsylvania, with headquarters at Northumberland, Pa., has been appointed main-line supervisor of track on the Long Island Railroad (part of the Pennsylvania), with headquarters at Jamaica, L.I., to succeed **Lee Spencer,** who has been granted a leave of absence. **F. S. King,** a member of the engineering corps, has been promoted to assistant supervisor of track at York, Pa., to succeed **J. H. Jones,** who has been transferred to Lancaster, Pa., to replace **C. H. Kooser,** who has been transferred to Northumberland to replace Mr. Hiltz.

Bridge and Building

H. A. Elwell, bridge supervisor on the Minnesota division of the Chicago Great Western, has been promoted to general bridge inspector, with headquarters as be-

(Continued on page 608)

If You Really Want to Beat the Labor Shortage



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In today's vital struggle to get the greatest possible amount of work done with the limited forces that are available, the WOOLERY JUNIOR WEED BURNER is helping railroad men all over the country to beat the promise.

The minimum program of weed eradication would be to keep the tie bed free of vegetation. This can be done most economically by the WOOLERY JR. Weed Burner—it uses the minimum of labor and oil. It is the all-around cheapest way known.

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In Tie Renewal Programs

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Every maintenance man will agree that tie renewals at best comprise a strenuous job and that by lightening the work better results are obtained. If the WOOLERY Tie Cutter accomplishes this, it alone is worth the investment but it does much more.

It eliminates cribbing, thereby reducing the amount of ballast to be handled 75%.

It is of great importance that the old tie bed be not disturbed, thereby giving the new tie a firm bed to rest on, resulting in a better road-bed.

Experience shows that men accustomed to working with these machines become so proficient that tamping is reduced to a minimum and in many cases is entirely eliminated.

It is a proven product. You can't go wrong, so why not try it?

WOOLERY MACHINE COMPANY MINNEAPOLIS MINNESOTA

fore at St. Paul, Minn., a newly-created position.

W. H. Pryor, foreman of water service on the St. Louis-San Francisco at Memphis, Tenn., has been promoted to general foreman of bridges and buildings-water service, of the Southern division, with the same headquarters. Likewise, **A. N. Matthews** and **Virgil Leak,** foremen of water service at Fort Scott, Kan., and Tulsa, Okla., have been promoted to general foremen of bridges and buildings-water service of the Northern and Southwestern divisions, respectively, with the same headquarters.

F. L. Lee, whose promotion to master carpenter on the Cincinnati division of the Pennsylvania, with headquarters at Cincinnati, Ohio, was reported in the June issue of *Railway Engineering and Maintenance*, was born at Birdsboro, Pa., on January 24, 1903, and entered railway service in April, 1928, as a carpenter on the Philadelphia division of the Pennsylvania, subsequently serving as assistant foreman and foreman until 1936 when he was appointed foreman, bridges and buildings. In April, 1942, Mr. Lee was advanced to assistant master carpenter of the New York diviison, holding that position until his new appointment, effective May 1.

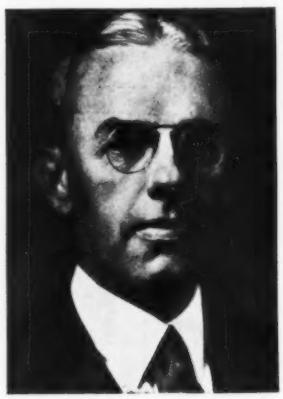
Franz M. Misch, assistant engineer on the Pacific Lines of the Southern Pacific, has been promoted to general bridge and building supervisor, with headquarters as before at San Francisco, Cal. Mr. Misch was born at Dos Palos, Cal., on December 3, 1907, and graduated in civil engineering from the University of California in 1928. He entered railroad service on April 8, 1929, as a concrete inspector on the Southern Pacific and in the same year he was advanced to chief inspector of foundations at Martinez, Cal. He subsequently served as junior engineer and inspector at San Jose, Cal., and from January, 1932, to October, 1933, he worked as resident and traffic engineer of the American Toll Bridge Company at Vallejo, Cal. He later worked as assistant bridge construction engineer for the Department of Public Works on the San Francisco-Oakland Bay bridge and in April, 1936, he returned to the Southern Pacific as a steel bridgeman, later being advanced to assistant foreman of the system steel bridge gang. Two years later Mr. Misch was advanced to bridge and building inspector of the San Joaquin division, with headquarters at Bakersfield, Cal., later serving successively as assistant bridge and building supervisor on that division and head inspector on the Shasta dam railroad relocation. In July, 1941, he was promoted to the position he held at the time of his new appointment.

Obituary

Nels Jorgensen, who retired as track supervisor on the Pere Marquette at Muskegon, Mich., in 1937, died at Muskegon at the age of 70 on May 26.

R. L. Holmes, engineer, water supply, of the Texas & Pacific, whose death on May 26 was reported in the June issue, was born in 1880, and entered railway service on March 22, 1900, as a rodman on the T. & P., subsequently serving as instrumentman, assistant engineer and division engineer. From August, 1915, to August, 1917, Mr. Holmes served as assistant chief engineer, with headquarters at Dallas, and on the latter date he was appointed to the position he held at the time of his death.

Philemon S. Lewis, general manager of the Reading, with headquarters at Reading, Pa., and an engineer by training and experience, died in a hospital in that city



Philemon S. Lewis

on July 7. Mr. Lewis was born at Springfield, Ill., on May 10, 1889, and graduated from Princeton University in 1911. He entered railway service in 1911 as a rodman on the Philadelphia & Reading (now the Reading), at Williamsport, Pa., subsequently serving as assistant supervisor of track, signal inspector, supervisor of track and trainmaster. After serving with the U. S. Army during World War I, Mr. Lewis returned to the Reading as trainmaster at Philadelphia on October 1, 1919, later serving as assistant superintendent of the Atlantic City division, superintendent of the Atlantic City and the New York divisions, assistant o the vice-president at Philadelphia and general manager.

John L. Downs, retired superintendent of the Illinois division of the Illinois Central, whose death on May 17 was reported in the June issue of *Railway Engineering and Maintenance*, was born at Greencastle, Ind., on August 20, 1870, and entered railroad service as a section foreman on the Illinois Central at Kankakee, Ill. On March 1, 1897, he was promoted to track supervisor at Pana, Ill., subsequently serving in that capacity at Kankakee, Ill., and Rantoul. On April 1, 1902, he was advanced to roadmaster at Fort Dodge, Iowa, and two years later was transferred to Vicksburg, Miss. On September 1, 1911, he was transferred to Memphis, Tenn., and eight years later he was transferred to Champaign. Mr. Downs was promoted to district engineer of the Northern lines, with headquarters at Chicago, on February 1, 1925, and on October 1, 1929, he was advanced to the position he held at the time of his retirement.

Association News

Bridge and Building Association

President G. S. Crites plans to call a meeting of the Executive committee in August to review the work that has been done by the various technical committees of the association.

Maintenance of Way Club of Chicago

President F. G. Campbell plans to call a meeting of the officers and directors of the Club during August to complete the selection of the standing committees and to formulate plans for the fall and winter season of meetings, which will begin on October 25.

Roadmasters' Association

The association has now developed its plans for its annual meeting which was scheduled to be held in Chicago on September 14-16. The annual meeting, as such, has been cancelled, and in its place will be held a one-day business meeting of the Executive Committee, the chairmen and members of all technical committees and such other members as find it possible to attend, to receive and act upon the reports of the committees and to organize the work for the ensuing year. This plan was decided upon at a meeting of the Executive committee in Chicago on July 24, in the interest of co-operating with the railways and Director Eastman of the Office of Defense Transportation in reducing train travel, while at the same time making available to the members the constructive reports that have been prepared, and to enable the association to plan most effectively for its work in the year ahead. The one-day business meeting in Chicago will be held on September 15 at the Sherman Hotel. Following the meeting, it is planned to publish the usual proceedings and to make them available to members at the earliest possible date.

American Railway Engineering Association

Two standing committees of the association held meetings in June and July, these being the Committee on Water Service, Fire Protection and Sanitation, which met in Chicago on July 13, and the Committee on Buildings, which met in Chicago on July 28 and 29. No committees have yet scheduled meetings in August, but a meeting of the Board of Direction will be held in Chicago on August 5, to consider among other things, the requests of the various technical committees for funds to carry out research work in 1944.

Early in July, copies of the 1943 volume of the Proceedings, were mailed to members, and late in the month, members were sent the June-July Bulletin of the Association, No. 439, and the annual Supplement to the Manual, the latter incorporating all additions to and revisions of Manual material as a result of association action. The features of Bulletin No. 439 include the

(Continued on page 610)

Right now, on miles and miles of rail, corrosion is sinking its claws into all those concealed surfaces of rail joints that lack proper lubrication and protection against rust.

HALT Rail Joint Corrosion with R M C PLASTIC . . . time-proved and field-tested metal preserving compound which, with one simple application, will positively and permanently prevent corrosion everywhere within the rail joint area.

Rail Joints, with proper bolt tension, that are lubricated with RMC PLASTIC do not "freeze" but can expand and contract properly so that rail-end batter is reduced.

RMC PLASTIC is easily applied on the inner faces of the joint bars. When they are bolted to the rails (with the handy RMC Tool) the bolting action solidly packs the PLASTIC into every section of the joint assembly.

A Pound of RMC Plastic May Save a Ton of Rail!
You Can Get ALL You Want NOW—When You Need It!

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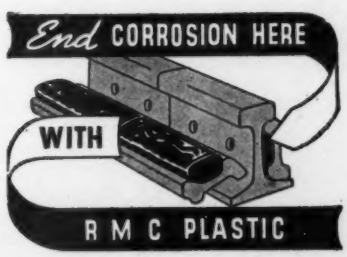


results of an impact investigation on a plate girder bridge on the Pennsylvania at Elkton, Md., as compiled for the Special Committee on Impact by the research staff of the Engineering division, A.A.R.; the preliminary report of the Committee on Ties, containing statistics relative to 1942 tie renewals; a memorial to Emil Herbert Fritch, long-time secretary of the association, who died on March 18, 1943; and a presentation of the style standards of the association to aid members in the preparation of committee reports.

Wood-Preservers' Association

At a meeting of the Executive committee in Chicago on June 24, consideration was given to the organization of technical committees for the ensuing year and the following chairmen were chosen: Preservatives, R. H. Baechler, chemist, Forest Products Laboratory, Madison, Wis.; Pressure Treatment of Oak Ties and Lumber, P. D. Brentlinger, resident inspector, Forest Products, Penna., Philadelphia, Pa.; Pressure Treatment of Southern Pine Ties and Lumber, H. G. McElhinney, The Barrett Div., Allied Chemical & Dye Corp., St. Louis, Mo.; Pressure Treatment of Gum Ties and Lumber, J. E. Mausteller, chief tie and timber inspector, Seaboard, Jacksonville, Fla.; Pressure Treatment of Southern Pine Piles, P. B. Mayfield, manager, research and development, International Creosoting and Construction Co., Galveston, Texas; Pressure Treatment of Poles, W. R. Yeager, inspection engineer, Western Electric Co., Inc., New York; Non-Pressure Treatment of Poles, J. P. Wentling, wood technologist, Consolidated Treating Co., Minneapolis, Minn.; Inspection, H. F. Round, Penna., Philadelphia, Pa.; Tie Service Records, W. J. Burton, asst. to ch. eng., Missouri Pacific, St. Louis, Mo.; Bridge and Structural Timber, T. H. Strate, div. eng., C. M. St. P. & P., Chicago; vice-chairman, W. D. Keeney, Engineer, Service Bureau, American Wood-Preservers' Association, Chicago; Marine Pile Service Records, A. S. Daniels, supt. treating plant, Texas & New Orleans, Houston, Texas; Pole Service Records, H. A. Haenseler, Engr. Dept., Western Union Telegraph Co., New York; Post Service Records, J. O. Blew, Forest Products Laboratory, Madison, Wis.; Diversified Uses of Treated Wood, Leonard Perez, dis. sales manager, Wood Preserving Division, Koppers Co., St. Louis, Mo.; Use of Treated Wood for Car Lumber, H. R. Condon, vice-pres., Wood Preserving Division, Koppers Co., Pittsburgh, Pa.; Fireproofing, R. H. Mann, engr., Service Bureau, American Wood-Preservers' Association, New York; Treated Wood Blocks, A. W. Cobley, president, Hicks-Cobley, Inc., Toledo, Ohio; Painting of Creosoted Wood, J. G. Segelken, engr., Bell Telephone Laboratories, New York.

Le Tourneau Lubrication Guide.—A poster-size lubrication chart for the guidance of users of the company's equipment has been prepared for distribution by R. G. Le Tourneau, Inc., Peoria, Ill. The chart covers the firm's complete line of power control units, Carryall scrapers, dozers, rooters, cranes and other units.

Supply Trade News

General

The Army-Navy "E" award for excellence in war production was awarded to employees of **Skilsaw, Inc.,** at a ceremony held in the company's Chicago plant on June 7.

The Army-Navy "E" award for excellence in war production was presented the officers and employees of the **Pettibone Mulliken Corporation,** Chicago, in ceremonies held at the company plant on July 20.

The Maritime "M" award for outstanding production achievement was awarded the **Air Reduction Company, Inc.,** and its subsidiaries in a ceremony held at the firm's plant in Bethlehem, Pa., on July 17.

The Maritime "M" award of the United States Maritime Commission for outstanding production achievement was presented the officers and employees of the **Air Reduction Company, Inc.,** in appropriate ceremonies at the Air Reduction Oxygen Plant, Bethlehem, Pa., on July 17.

Personal

M. Frank Dresmal, manager of machinery sales of the **United States Steel Supply Company,** has been appointed office manager of the Chicago sales department.

Joseph L. Mullin, works manager at the New Castle, Del., plant of the American Manganese Steel Division of the **American Brake Shoe Company,** has been appointed general superintendent of foundries, with headquarters at Chicago. **W. F. Kelly,** plant superintendent at New Castle, has been named works manager to succeed Mr. Mullin.

W. E. Gadd has been appointed assistant eastern sales manager of the **Rail Joint Company, Inc.,** with headquarters at New York, and **H. C. Hickey** has been appointed assistant western sales manager with headquarters at Chicago. **H. L. Lansing** has been appointed research engineer with headquarters at New York, and **Thomas Ryan** has been made chief inspector with headquarters at Chicago.

Henry H. Howard, formerly manager, engine sales department, of the **Caterpillar Tractor Company,** Peoria, Ill., who has been on temporary emergency service with the United States Ordnance Department, has returned to the Caterpillar Tractor Company as general sales manager. **J. Q. McDonald,** acting general sales manager, returns to his duties as export manager. **H. W. Smith,** assistant manager, engine sales department, has been advanced to manager of that department.

W. H. Robertson, eastern sales manager of the **Massey Concrete Products Company,** Chicago, with headquarters at New York, has been elected vice-president with headquarters at Chicago. Mr. Robertson graduated from Massachusetts Institute of Technology, and has been associated with the Massey Concrete Products Company and its predecessors since 1922. From that date until 1927 he was assistant chief engineer and, in 1927 he was made resident manager. Later he was appointed eastern sales manager, the position he was holding at the time of his recent election.

Obituary

Rowland R. Seward, eastern sales manager of the Rail Joint Company, Inc., died suddenly at his home in Flushing, N.Y., on July 3. Mr. Seward was born at New York on May 28, 1883, and had been connected with the Rail Joint Company since September 15, 1908. He had served as eastern sales manager, with headquarters at New York, since January, 1936.

Rowland R. Seward

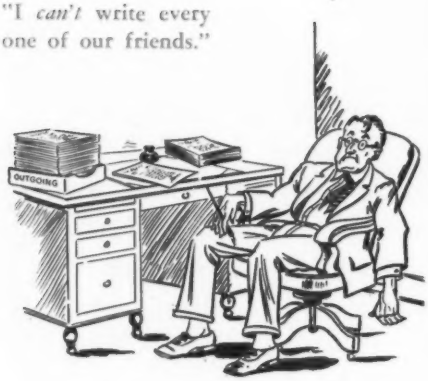
Charles Packard, field sales representative of the Simmons-Boardman Publishing Corporation, died suddenly at St. Paul, Minn., on July 2. He was 67 years of age. Mr. Packard had been associated with the Simmons-Boardman circulation department since 1926, prior to which time he had been with the Railway Review.

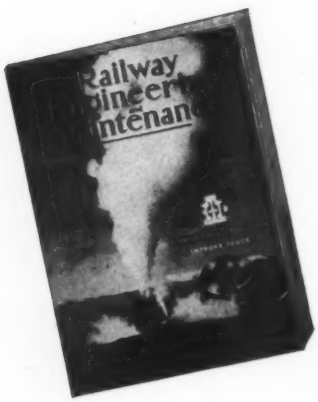
Trade Publications

Link-Belt Speed-o-Matic Cranes, Draglines and Shovels.—The Link-Belt Speeder Corporation, Chicago, has published a 24-page illustrated catalog, No. 1960, which describes its two- to three-yard Speed-o-Matic, series 500, cranes, draglines and shovels. The catalog, which is attractively printed in color, explains the design and construction features of the machines and also contains eight pages devoted to dimensions, clearance diagrams, working ranges, lifting capacities and brief specifications.

New Track Material Bulletin.—The Pettibone Mulliken Corporation, Chicago, has recently published a track material booklet, designated Bulletin No. 1043. Containing eight pages printed in color, the bulletin carries a number of large illustrations of various items manufactured by the corporation, including turntable frogs, shoulder bolts, guard rails, tongue switches, automatic switch stands and many others.

"I *can't* write every one of our friends."





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"Write Them Every Month"

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"And everywhere else, Bill. It's to be expected in war. That's what makes it more important than ever that we give our friends all the help we can."

"You're right there. I only wish I could tell our story to every one of 'em."

"Why can't you?"

"I can't catch up with them. They're on the road all the time, jumping from one part of their territory to another."

"Why don't you write 'em?"

"All of them? There are too many. But, Boss, that suggests a better idea."

"What's that?"

"Put our story into the advertising pages of *Railway Engineering and Maintenance.* We can reach 6000 of them there, for they all get that paper—and they read it too."

"And we can reach them *every month.*"

"That's right, and it'll keep us before them."

"Bill, you've given me a good idea; I'll see that it's done."

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It will be an age of quality, efficiency and speed! It will be an age in which Layne, with more than sixty years of outstanding success will enjoy even greater achievements. Innovations, discoveries and improvements made by Layne for Military and Naval use will speed the installation of wells. Pumps of greater capacity and higher efficiency will be in production. New hydrological engineering developments will be made available for all manner of industrial, commercial and agricultural use. Layne will brilliantly maintain the position of world leadership in the well water development field.

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Keeping right-of-ways open is more important today than ever before. If you are not using Stanley Electric Tools for vital maintenance work, write us for complete information. Stanley Electric Tool Division, The Stanley Works, 160 Elm St., New Britain, Connecticut.

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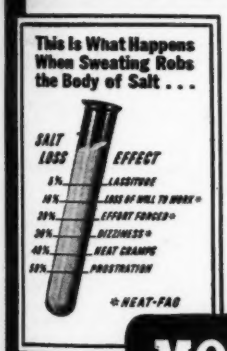
Railroad labor is too scarce today to risk losing even a few hours' work because of heat-fag, when the body salt lost by sweating can so easily be replaced by salt tablets.

Railroad shop employees, as well as maintenance-of-way workers are constantly subject to heat-fag due to sweating caused by hard work. As heat-fag sets in, lowered vitality, fatigue and an increasing tendency to do familiar things the wrong way often cause accidents and enforced lay-offs.

Salt tablets restore the body salt lost through sweating. They help keep men alert and efficient through long, hard, hot hours.

Numerous roads make salt tablets a "must" for men who sweat. During the hot summer months maintenance foremen should keep a supply on hand and encourage their men to use them freely.



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QUICK DISSOLVING (Less than 30 seconds)
This is how a Morton Salt Tablet looks when magnified. Examine one — see how soft and porous it is inside. When swallowed whole — with a drink of water, they dissolve in less than 30 seconds.

Case of 9000, 10-grain Salt Tablets, $2.60
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Place MORTON'S DISPENSERS at all Drinking Fountains
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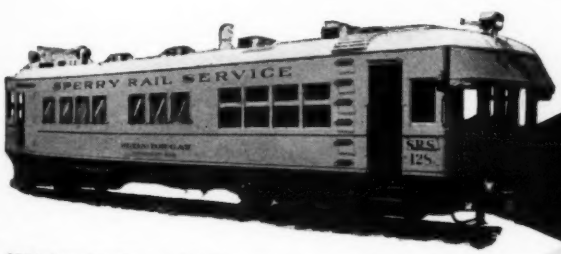

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